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Volume XIX January, 1929 Number 1

The Weather and the Common Cold*

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IT IS the object of this paper to set forth in greater detail than has been done[1,2] the apparent relationships between the weather and the minor respiratory illnesses, commonly described as colds, as reflected in the absences reported due to this cause in three groups of school pupils during a part of the school year 1926–1927. These groups are:

1. Pupils of grades 2 to 6 in 2 mechanically ventilated schools (Danforth and Seymour) at Syracuse, N. Y.
2. Pupils of grades 2 to 6 in 2 naturally ventilated schools (Merrick and Montgomery) at Syracuse, N. Y.
3. Pupils of 48 rooms in one- and two-room rural schools in school districts 1 and 2 of Cattaraugus County, N. Y.

In the autumn of 1926, the New York Commission on Ventilation inaugurated a series of investigations of the effects of air conditions in school classrooms on the health of the pupils. During the school year 1926–1927, such studies were conducted in 3 mechanically ventilated and 3 naturally ventilated schools in Syracuse, and in 48 one- and two-room rural schools of Cattaraugus County, N. Y.

The incidence of respiratory illness among the pupils was taken as the criterion for judging the healthfulness of the air conditions in the classrooms. It was not possible to arrange for sufficient medical or nursing service either to make the determinations in the classroom or to make the necessary home visits, and, consequently, the cause of absence as reported by the parents constituted the source of information as regards absentees. The teachers recorded their own impressions concerning the prevalence of colds among the pupils in attendance at each session. The teachers also recorded four times each session the temperature as indicated by a reliable thermometer in a typical location in each classroom.

* Report to the Committee on Public Health Climatology, delivered before the Vital Statistics Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 17, 1928.

In the Syracuse schools, differences of age and race stock of pupils were taken into consideration and eliminated as nearly as possible by limiting considerations to similar groups exposed to the different conditions created by the two types of ventilation. With this restriction, the observations in the Syracuse schools here reported relate to the pupils in grades 2 to 6, inclusive, in 2 mechanically ventilated schools —Danforth and Seymour—and in 2 schools with natural ventilation —Merrick and Montgomery.

Both boys and girls are registered in all these classes, the distribution by sex being approximately equal. The average age of the pupils in the 2 mechanically ventilated schools was 10.0 years, and in the 2 naturally ventilated schools 9.5 years. The percentage of pupils of American parentage was 71 in the mechanically ventilated schools, and 76 in the schools with natural ventilation. The number of pupils in the 2 mechanically ventilated schools was 1,086 and in the naturally ventilated schools 557.

The Syracuse study commencing November 29, 1926, and ending April 14, 1927, covered a period of 19 school weeks. It had been in progress but 4 weeks when it was interrupted by the Christmas holidays. Three weeks after these holidays were over, attendance was irregular because of the semi-annual examinations, and in the following week, the first of the second term, the records do not present an adequate picture of conditions because pupils who had not registered were not counted absent. In view of these irregularities and interruptions, it has been felt that for the purposes of this paper, consideration of these data should be limited to the period of 11 weeks from January 31 to April 14, 1927.

In the one- and two-room rural schools of Cattaraugus County, the number of pupils in the various schools was so small (the average being 18) and the pupils of foreign parentage so few in number that no attempt has been made to correct the data for these differences. Both boys and girls are registered in all these schools, which, giving elementary instruction only, are attended by pupils of approximately the same average age. The total number of pupils in the 48 classrooms was 860, and on the average (the records did not all commence and end at the same time) the study covered a period of 13 weeks of school.

In addition to studying the relationship between the types of ventilation, the air conditions in the classrooms and the incidence of colds among the pupils, the findings in each of these studies were also examined with reference to the outdoor temperature and precipitation, the weather data being taken from the records of the U. S. Weather Bureau.

DEFINITION OF TERMS

Mechanical Ventilation—Ventilation effected by means of mechanically driven supply and exhaust fans with appropriate ducts to and from each room, designed to provide each pupil with 30 cubic feet of air per minute.

Natural Ventilation—Ventilation by means of natural forces in which air change in rooms is dependent upon and effected by the difference in density of warm and cold air, and by wind direction and pressure.

Respiratory Illness—Coryza, pharyngitis, tonsillitis, laryngitis, bronchitis, pneumonia, grippe, etc. Except in those cases where a physician made the diagnosis, these terms were interpreted as cold and (or) sore throat.

Respiratory Illness Absenteeism—Absenteeism due to the above causes, expressed as a percentage of the total pupil-sessions for which the pupils were registered.

Indoor-Outdoor Temperature Difference—In order to facilitate the study of the association between outdoor temperatures and the incidence of respiratory illness among school pupils the temperature curve has been inverted. For Syracuse, the weekly mean of the outdoor temperature at 8 A.M., at noon, and at 4 P.M. on school days has been subtracted from 70° F. (the average indoor temperature).

In Cattaraugus County, where hourly outdoor temperature readings were not available, the weekly mean of the maximum and minimum temperatures has been subtracted from 70° F.

The inverted temperature curve thus shows the difference between indoor and outdoor temperatures at times when such differences, together with the conditions in the classrooms, might have a bearing on the incidence of respiratory illness among the pupils.

Precipitation—Precipitation is expressed in terms of inches of rain and (or) melted snow. In these studies precipitation has been grouped in 6 different ways, as follows:

1. Total precipitation for the 7 days ending on the Friday of the school week.
2. Precipitation on the 5 school days of the week.
3. Precipitation on the 5 school days of the week plus that over the preceding week end when such precipitation was in the form of snow.
4. Total precipitation for the 7 days of the week ending Wednesday.
5. Precipitation for the 5 school days of the week ending Wednesday.
6. Precipitation for the 5 school days of the week ending Wednesday plus that on Saturday and Sunday when such precipitation was in the form of snow.

FINDINGS

A. Syracuse

Table I shows the rates of absenteeism reported due to respiratory illness in the two groups of schools for the entire period of the study.

The mean outdoor temperatures for (1) the entire week, (2) on school days, (3) 8 A.M., noon, and 4 P.M., on school days, and (4) the daytime indoor-outdoor-temperature difference, on school days, are shown in Table II.

In Table III are given for each week: (1) the total precipitation for the 7 days ending Friday, (2) the precipitation on school days only,

TABLE I

ABSENTEEISM REPORTED DUE TO RESPIRATORY ILLNESS [1] IN MECHANICALLY AND NATURALLY VENTILATED SCHOOLS

School Ventilation Study—Syracuse, N. Y., 1926–1927 [2]

Week Ending Friday 1926	Mechanically Ventilated Schools [3]	Naturally Ventilated Schools [4]
Dec. 3	3.6	2.0
10	3.5	3.6
17	3.6	2.7
24	3.1	2.5
31	—	—
1927		
Jan. 7	3.9	2.3
14	3.6	4.5
21	2.8	3.5
28	1.6	0.7
Feb. 4	2.7	2.4
11	2.9	2.6
18	3.8	3.1
25	3.8	2.4
Mar. 4	3.0	2.1
11	2.7	1.3
18	1.9	1.0
25	2.9	1.1
Apr. 1	2.2	1.1
8	2.3	1.7
14	1.7	1.4

1. Grades 2 to 6 inclusive—Rate per 100 pupil-sessions
2. The average age, the sex distribution and the race stock of the pupils are practically identical in the two types of ventilation
3. Danforth and Seymour schools
4. Merrick and Montgomery schools

and (3) the precipitation on school days plus that over the preceding week end, when such precipitation was in the form of snow.

Table IV gives information similar to that in Table III, but in each case the period for which the precipitation is given ends on Wednesday. The essential data presented in Tables I to IV are shown in Figure I.

Coefficients of correlation between the respiratory illness absenteeism, temperature difference and precipitation have been calculated. The important ones are given in the Summary of Findings.

In addition to the demonstration of association between the variations in respiratory illness absenteeism in the mechanically ventilated schools with precipitation, and the apparent lack of relationship between the variations in the absenteeism due to this cause and the variations in outdoor temperature, by means of correlation, these same facts are brought out in a striking manner in Table V.

Of the 5 weeks in which the indoor-outdoor temperature difference exceeded the trend, i.e., weeks that were colder than the average, only 3 correspond with weeks in which the rates of respiratory illness absenteeism in the mechanically ventilated schools exceeded their seasonal trend, whereas each of these 5 weeks corresponds exactly with the weeks in which the precipitation on school days of the week ending Wednesday, plus the week-end precipitation when such precipitation was in the form of snow, exceeds the mean.

It is interesting to note that during the coldest week of the period (that ending March 4) the respiratory illness absenteeism was but 0.1 per cent above the trend value, and for the 2 weeks following (when the precipitation was low), such absenteeism was not in excess of the

TABLE II

MEAN OUTDOOR TEMPERATURE [1] AND MEAN INDOOR-OUTDOOR TEMPERATURE DIFFERENCE
School Ventilation Study—Syracuse, N. Y., 1926–1927

Week Ending Friday 1926	Mean Outdoor Temperature: Entire Week [2]	Mean Outdoor Temperature: Monday to Friday [2]	Mean Outdoor Temperature: Daytime Monday to Friday [3]	Temperature Difference: Daytime Monday to Friday [4]
Nov. 26	35	36	37	33
Dec. 3	28	27	28	42
10	20	23	24	46
17	27	25	25	45
24	24	30	31	39
31	27	28	29	41
1927				
Jan. 7	23	25	25	45
14	16	18	20	50
21	26	34	35	35
28	20	17	16	54
Feb. 4	34	31	29	41
11	30	32	32	38
18	31	34	33	37
25	31	36	36	34
Mar. 4	23	21	21	49
11	39	40	41	29
18	51	49	50	20
25	36	34	35	35
Apr. 1	37	37	38	32
8	39	39	40	30
14	39	40	43	27

1. Derived from the records of the Station of the U. S. Weather Bureau, Syracuse, N. Y., through the courtesy of the Meteorologist, M. R. Sanford.
2. Mean of the daily maximum and minimum temperatures
3. Mean of the temperatures at 8 A.M., noon, and 4 P.M., Monday to Friday, inclusive
4. Indoor temperature (assumed 70° F.) less the mean of the temperatures at 8 A.M., noon, and 4 P.M., Monday to Friday, inclusive

FIGURE I

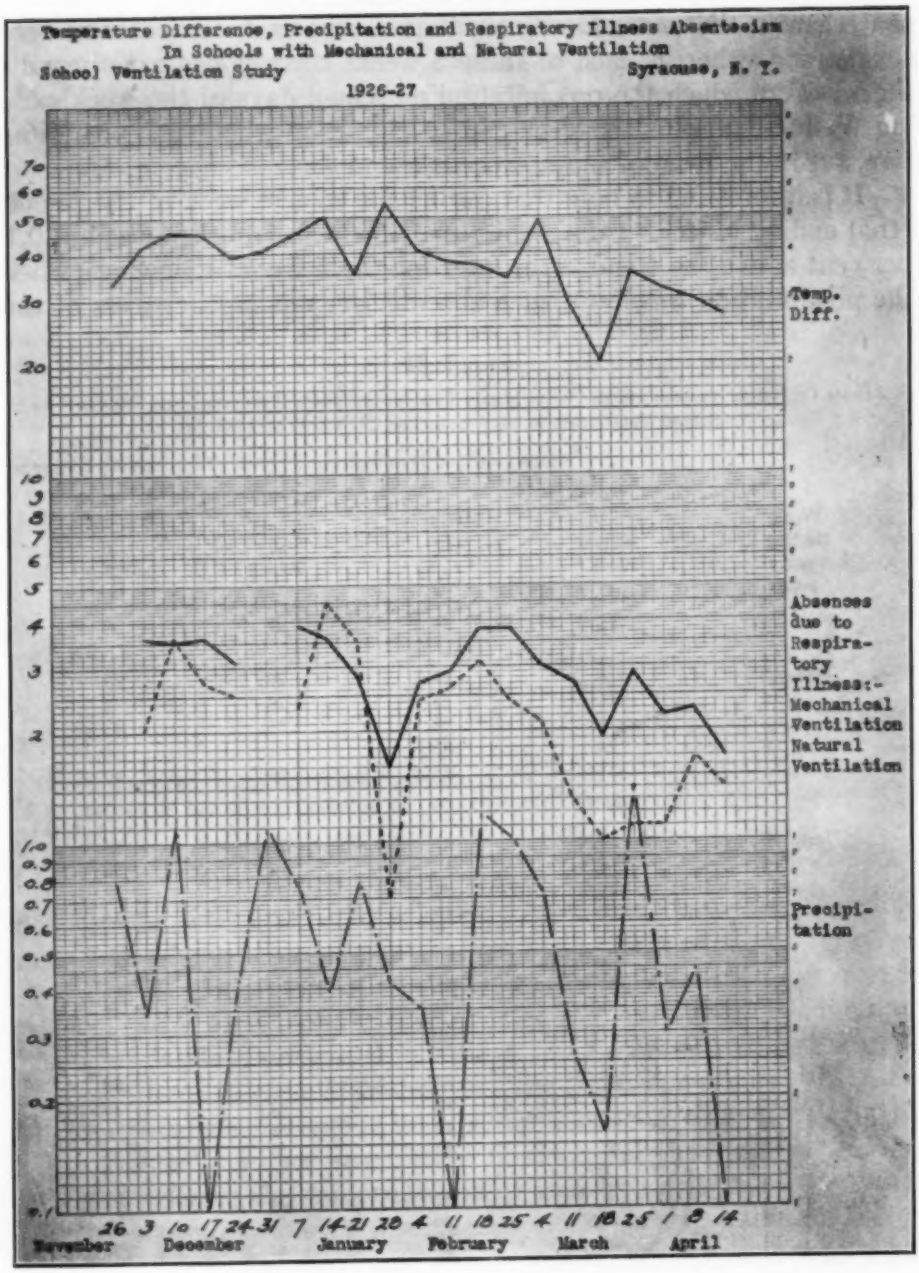
Temperature Difference, Precipitation and Respiratory Illness Absenteeism
In Schools with Mechanical and Natural Ventilation
School Ventilation Study
Syracuse, N. Y.
1926-27
Temp. Diff.
Absences due to Respiratory Illness:- Mechanical Ventilation Natural Ventilation
Precipitation
November
December
January
February
March
April

FIGURE II

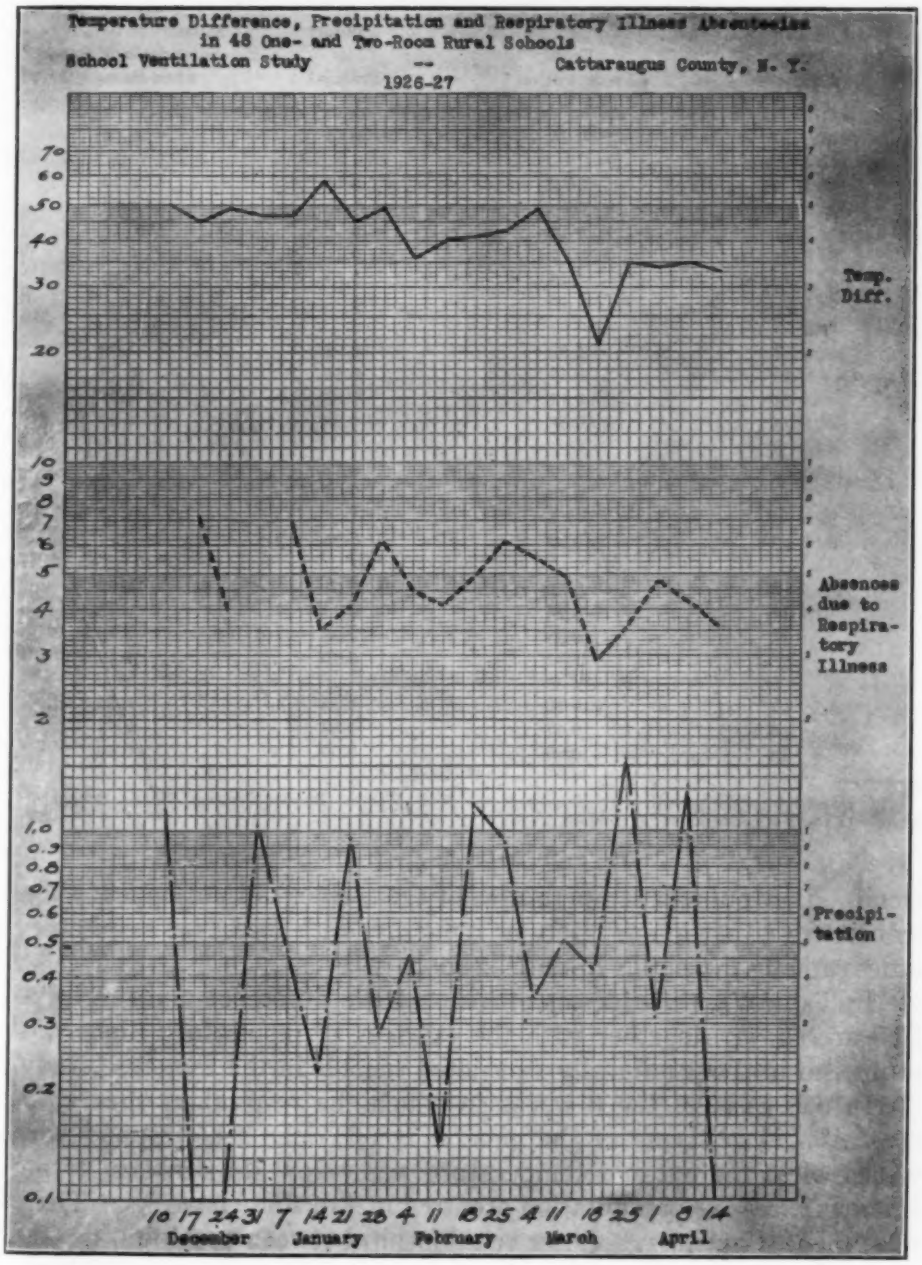
Temperature Difference, Precipitation and Respiratory Illness Absenteeism
in 48 One- and Two-Room Rural Schools
School Ventilation Study -- Cattaraugus County, N. Y.
1926-27
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Temp. Diff.
Absences due to Respiratory Illness
Precipitation
10 17 24 31 7 14 21 28 4 11 18 25 4 11 18 25 1 8 14
December January February March April

TABLE III

WEEKLY PRECIPITATION, SYRACUSE, N. Y., 1926–1927 [1]

School Ventilation Study—Syracuse, N. Y., 1926–1927

Week Ending Friday 1926	Total Precipitation [2]	Monday to Friday [2]	Monday to Friday plus Saturday and Sunday when Snow fell [2]
Nov. 26	0.26	0.14	0.14
Dec. 3	0.59	0.43	0.43
10	0.99	0.30	0.99
17	0.26	0.18	0.26
24	0.27	0.27	0.27
31	1.15	0.89	1.15
1927			
Jan. 7	1.00	0.92	1.00
14	0.19	0.19	0.19
21	0.71	0.68	0.71
28	0.59	0.30	0.59
Feb. 4	0.34	0.18	0.18
11	0.18	0.01	0.01
18	1.66	1.41	1.41
25	0.92	0.26	0.92
Mar. 4	0.59	0.01	0.59
11	0.28	0.25	0.25
18	0.38	0.38	0.38
25	1.19	0.59	1.19
Apr. 1	0.70	0.36	0.36
8	0.47	0.42	0.42
14	0.00	0.00	0.00

1. Derived from the records of the Station of the U. S. Weather Bureau, Syracuse, N. Y., through the courtesy of the Meteorologist, M. R. Sanford
2. Inches of rain and melted snow

trend. Low outdoor temperatures of themselves did not appear to be associated, either immediately or remotely, with increased respiratory illness among the pupils in these schools.

In Table VI, the excesses of temperature difference and precipitation are shown, together with the excesses of respiratory illness absenteeism in the 2 naturally ventilated schools in the Syracuse study.

In this case, of the 6 weeks in which the respiratory illness absenteeism is in excess of the general trend, only 2 correspond with weeks when the outdoor temperature was below the seasonal trend, whereas excessive precipitation occurred in 4 of these 6 weeks. There was, then, it appears, a closer relationship between precipitation and respiratory illness absenteeism in these schools than between such absenteeism and low outdoor temperatures.

TABLE IV

WEEKLY PRECIPITATION, SYRACUSE, N. Y., 1926–1927 [1]

School Ventilation Study—Syracuse, N. Y., 1926–1927

Week Ending Wednesday	Total [2]	School Days Thursday to Wednesday	School Days Thursday to Wednesday when Snow fell [2]
1926			
Nov. 24	0.91	0.79	0.79
Dec. 1	0.50	0.34	0.34
8	1.12	0.43	1.12
15	0.10	0.02	0.10
22	0.41	0.41	0.41
29	1.10	0.84	1.10
1927			
Jan. 5	0.75	0.67	0.75
12	0.39	0.39	0.39
19	0.78	0.75	0.78
26	0.41	0.12	0.41
Feb. 2	0.51	0.35	0.35
9	0.23	0.06	0.06
16	1.44	1.19	1.19
23	1.01	0.35	1.01
Mar. 2	0.72	0.14	0.72
9	0.29	0.26	0.26
16	0.16	0.16	0.16
23	1.41	0.81	1.41
30	0.64	0.30	0.30
Apr. 6	0.50	0.45	0.45
13	0.03	0.03	0.03

1. Derived from the records of the Station of the U. S. Weather Bureau, Syracuse, N. Y., through the courtesy of the Meteorologist, M. R. Sanford
2. Inches of rain and melted snow

TABLE V

INDOOR-OUTDOOR TEMPERATURE DIFFERENCE, PRECIPITATION AND RESPIRATORY ILLNESS ABSENTEEISM IN GRADES 2 TO 6 OF TWO MECHANICALLY VENTILATED SCHOOLS—DANFORTH AND SEYMOUR—JANUARY 31 TO APRIL 14, 1927

School Ventilation Study—Syracuse, N. Y., 1926–1927

Week Ending Friday	Excess: Indoor-Outdoor Temperature Difference Over Trend	Excess: Observed Respiratory Illness Absenteeism Over Trend	Excess: Precipitation (No. 6) Over 0.40 inch
Feb. 4	0.6	—	—
11	—	—	—
18	—	0.7	0.79
25	—	0.8	0.61
Mar. 4	13.9	0.1	0.32
11	—	—	—
18	—	—	—
25	3.8	0.5	1.01
Apr. 1	2.1	—	—
8	1.4	0.1	0.05
14	—	—	—

TABLE VI

INDOOR-OUTDOOR TEMPERATURE DIFFERENCE, PRECIPITATION AND RESPIRATORY ILLNESS ABSENTEEISM IN GRADES 2 TO 6 OF TWO NATURALLY VENTILATED SCHOOLS—MERRICK AND MONTGOMERY—JANUARY 31 TO APRIL 14, 1927
School Ventilation Study—Syracuse, N. Y., 1926–1927

Week Ending Friday	Excess		
	Indoor-Outdoor Temperature Difference Over Trend	Observed Respiratory Illness Absenteeism Over Trend	Precipitation (No. 6) Over 0.40 inch
Feb. 4	0.6	—	—
11	—	0.1	—
18	—	0.8	0.79
25	—	0.2	0.61
Mar. 4	13.9	0.1	0.32
11	—	—	—
18	—	—	—
25	3.8	—	1.01
Apr. 1	2.1	—	—
8	1.4	0.5	0.05
14	—	0.4	—

B. Cattaraugus County

Table VII shows the mean outdoor temperature, the mean indoor-outdoor temperature difference (70° F. minus the mean outdoor temperature), the absenteeism reported due to respiratory illness and the total precipitation for each week of the study.

Inasmuch as the study of the relation between weather conditions and the incidence of colds among the pupils was supplementary to the investigation of the effects of air conditions in the schoolrooms—there being no essential difference in the method of ventilation of the various schools and consequently no attempt to demonstrate a differential effect of outdoor weather conditions under different methods of ventilation, as was the case in Syracuse—the weather data presented in Table VII relate to the entire week ending Friday and are not restricted simply to school days.

This information was taken from the reports of the U. S. Weather Bureau and is based on temperature observations at the Allegany State Park and on the precipitation recorded at Olean, N. Y. Both of these points of observation are within Cattaraugus County and are the Weather Bureau stations nearest the schools included in the study.

Maximum and minimum temperature readings are taken but once daily, and this prevents the detailed consideration of daytime temperatures that was possible for Syracuse where the hourly observations are available.

Similarly, differentiation is not made in the published reports of the data furnished by the coöperative observer at Olean between precipitation in the form of snow and that as rain. Much of the winter time precipitation in Cattaraugus County is snow which remains on the ground for considerable periods, and the pupils have to go through it morning and night on their way to and from school.

The information given in Table VII is presented graphically in Figure II.

TABLE VII

TEMPERATURE DIFFERENCE, PRECIPITATION AND RESPIRATORY ILLNESS ABSENTEEISM IN ONE- AND TWO-ROOM RURAL SCHOOLS—CATTARAUGUS COUNTY, N. Y., 1926–1927

Week Ending	Mean Outdoor Temperature	Mean Indoor-Outdoor Temperature Difference	Respiratory Illness Absenteeism	Total Precipitation
1926				
Dec. 10	20	50	—	1.13
17	25	45	7.2	0.04
24	21	49	3.9	0.09
31	23	47	—	1.04
1927				
Jan. 7	23	47	7.0	0.47
14	12	58	3.5	0.22
21	25	45	4.1	0.96
28	21	49	6.2	0.28
Feb. 4	34	36	4.5	0.46
11	30	40	4.1	0.14
18	29	41	4.9	1.18
25	27	43	6.1	0.95
Mar. 4	21	49	5.5	0.35
11	35	35	4.9	0.51
18	49	21	2.9	0.42
25	35	35	3.6	1.57
Apr. 1	36	34	4.8	0.31
8	35	35	4.2	1.32
15	37	33	3.6	0.00

Examination of this chart shows that the general trends in the two curves of temperature difference and of respiratory illness absenteeism are of the same character, but the fluctuations of the latter do not closely correspond with variations in the temperature difference. It will be seen, however, that, with but one exception, whenever the precipitation exceeds the mean, the following week shows an excess of respiratory illness absenteeism. See Table VIII.

Comparison of the data in columns 1 and 2 of Table VIII shows that of the 7 weeks in which temperatures were below the seasonal

average (trend line), only 4 correspond with weeks in which the respiratory illness absenteeism is above the average trend. On the other hand, 5 weeks which show an excess of respiratory illness have outdoor temperatures above the average. What is perhaps more striking is the fact that during the coldest week of the study period, i.e., when the indoor-outdoor temperature difference is greatest (that ending January 14, 1927), respiratory illness absenteeism was far below the average for the period as determined by the general trend.

The second coldest week of the study period was that ending March 4, when the outdoor temperature averaged 20° F., 7 degrees colder than the preceding week. Despite this temperature drop, the excess of respiratory illness absenteeism declined to two-thirds that of the previous week.

TABLE VIII

INDOOR-OUTDOOR TEMPERATURE DIFFERENCE, PRECIPITATION AND RESPIRATORY ILLNESS ABSENTEEISM IN 48 ONE- AND TWO-ROOM RURAL SCHOOLS—DECEMBER 6, 1926, TO APRIL 14, 1927

School Ventilation Study—Cattaraugus County, N. Y.

Week Ending Friday	Excess		
	Indoor-Outdoor Temperature Difference Over Trend	Observed Respiratory Illness Absenteeism Over Trend	Precipitation During Week Over Mean
Dec. 10	—	—	0.46
17	—	1.6	—
24	—	—	—
31	—	—	0.37
Jan. 7	—	1.7	—
14	11	—	—
21	1	—	0.29
28	4	1.2	—
Feb. 4	—	—	—
11	—	—	—
18	—	0.2	0.51
25	3	1.5	0.28
Mar. 4	10	1.0	—
11	—	0.5	—
18	—	—	—
25	—	—	0.90
Apr. 1	—	0.7	—
8	3	0.2	0.65
14	2	—	—

Comparing the data in columns 2 and 3 of Table VIII shows that excessive precipitation (above the mean) is followed, 6 times out of 7, by excessive respiratory illness absenteeism in the following week, the only exception to this rule being the last week of the study. Of the

other 3 weeks to show an excess of respiratory illness absenteeism, 2 follow weeks with excessive precipitation with a lag of 2 weeks. The remaining week to show respiratory illness in excess (0.2 per cent) of the trend line value is that ending February 18, 1927, a week during which the precipitation was practically double that of the mean, the effect on the incidence of respiratory illness showing more promptly than usual.

Although the correlation coefficients involve the magnitude as well as the correspondence in the deviations, they amply support the suggestion from the Syracuse Study that fluctuations in respiratory illness (as reflected in the absenteeism reported due to this cause) are closely associated with precipitation.

SUMMARY OF FINDINGS

1. In these studies, the curves of respiratory illness absenteeism follow the same *general* trend as does the curve of difference between the weekly mean indoor and outdoor temperatures (see Figures I and II).

2. In the 2 mechanically ventilated schools, there appeared to be a high degree of relationship between the variations in the respiratory illness absenteeism and the amount of precipitation with a lag of 2 days. Correlation coefficient $+ 0.84 \pm 0.09$ (see Figure I and Table V).

3. This close relationship between precipitation and respiratory illness did not appear to hold true for the two naturally ventilated schools. Correlation coefficient $+ 0.34 \pm 0.27$ (see Figure I and Table VI).

4. In the one- and two-room rural schools of Cattaraugus County, the variations in respiratory illness absenteeism appeared to be closely associated with precipitation but with the lag of 1 week. Correlation coefficient $+ 0.64 \pm 0.15$ (see Figure II and Table VIII).

5. In none of these three groups does the variation in absence due to respiratory illness appear to be closely associated with changes in the outdoor temperature. The correlation coefficients when the parallel general trends are removed are:

1. For the mechanically ventilated schools (See Figure I and Table V)	-0.34 ± 0.27
2. For the naturally ventilated schools (See Figure I and Table VI)	-0.30 ± 0.28
3. For the rural schools (See Figure II and Table VIII)	-0.15 ± 0.24

CONCLUSIONS

1. The variations in the incidence of acute respiratory diseases in three groups of school pupils during the school year 1926–1927 appear to be more closely associated with variations in precipitation than with variations in outdoor temperature.

2. A possible explanation of this may lie in the following facts:

a. The evaporation of moisture from the shoes and clothing of the pupils is a heat absorbing process—60 b.t.u. of heat (15 kilogram-calories) being required to evaporate each ounce of water.

b. Under normal conditions of classroom occupancy, the heat required to effect this evaporation of moisture is absorbed from the pupil.

c. Unless pupils' heat production is sufficient to compensate for this abnormal heat extraction, they will be chilled either sensibly or insensibly.

3. Just how such chilling is associated with the onset of acute respiratory disease is not clear.

REFERENCES

1. Duffield, Thomas J. Effects of Mechanical and Natural Ventilation on the Health of School Children. *J. Am. Soc. Heat. & Vent. Eng.*, Apr., 1928.

2. Duffield, Thomas J. The School Ventilation Studies of the New York Commission on Ventilation during the School Year 1926–1927. *Am. School Bd. J.*, Jan., 1928.

Before-and-After Statistics

WE are frequently confronted with a chart showing, by the heights of two bars, the average death rates from some given cause, for 5 years before and for 5 years after the inauguration of some campaign against the disease in question. If the later 5-year average rate is appreciably lower than the earlier, it is held to be demonstrated that the program undertaken was followed by a decline in mortality from the disease combated. Such *may*, in fact, be the case; but it may not.

Inquire of the person compiling the statistics why he used the death rate over a period of 5 years, and he will reply that it was in order to "smooth out the chance fluctuations" or to "reduce the probable error." Admittedly, a 5-year death rate is less subject to "chance variations" than is the rate for a single year; especially is this true where the population concerned is small.

But it very frequently happens that this process of "smoothing out chance fluctuations" also smooths out all meaning from the data. Let us take the typical instance of Bunkville, a city which has been carrying on a campaign of publicity against typhoid fever since the beginning of the year 1923. After waiting for 5 years, wisely, in order to have sufficient data to evaluate the results of the experiment, the Bunkville Health Department published a graph, which is reproduced here (Figure I), showing that during the 5 years 1918–1922 the average typhoid fever death rate was 14 per 100,000 population; and during the 5 years following, only 11 per 100,000 population—a reduction of over 20 per cent following the inauguration of the publicity campaign.

The present writer has taken the trouble to obtain from Bunkville the statistics for the separate years composing the two 5-year periods. These data are shown in Figure II. It appears from them that the decline in mortality from typhoid took place entirely *before* the beginning of the publicity campaign, and that since the campaign was started there has been a continual increase of the rate.

One can easily demonstrate that if the situation in Bunkville had been different, the average death rate for the second 5-year period in question might have been higher than the first, and yet a very definite reduction might have taken place after the beginning of the campaign. It is also, of course, possible to construct situations in which the two 5-year averages would truthfully portray what had actually happened.

It should be apparent that the essential thing to be measured in evaluating the effects of a campaign against a disease is the change brought about in the *trend* of the mortality or morbidity rate. Thus if it could be shown that as a result of a given campaign a specific death rate which had been rising from year to year was made to fall, or to rise less rapidly, some progress might be claimed. The practical

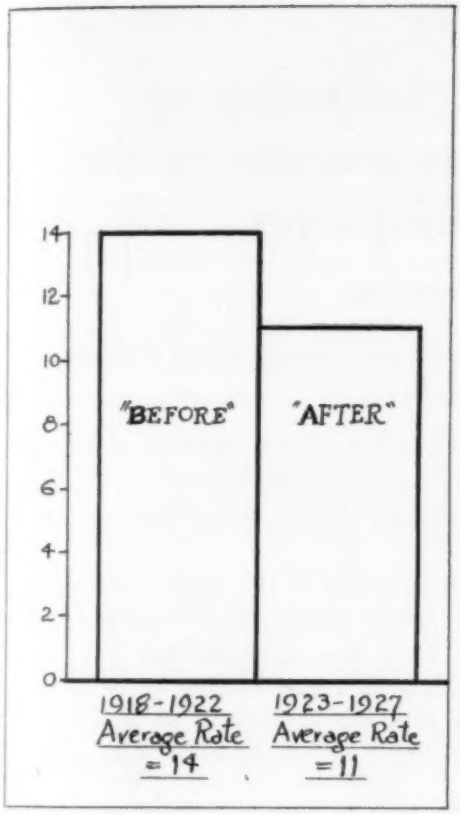

Figure I - The Story as Told by Averages.

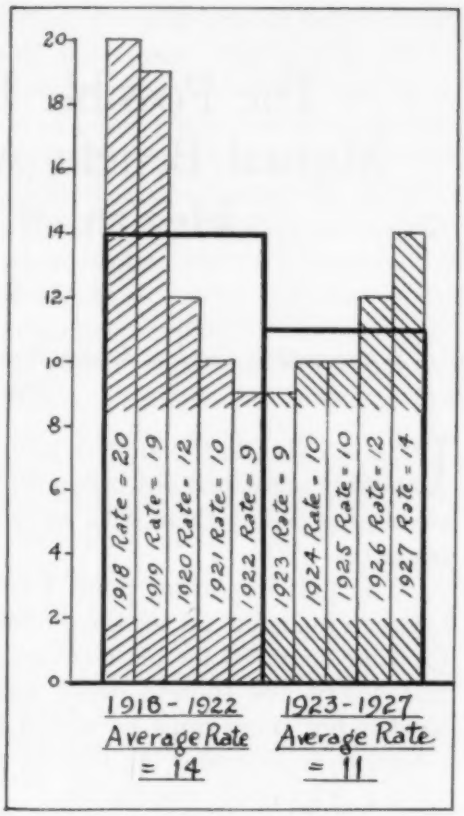

Figure II - What Actually Happened.

objection almost raises itself: But to compute a significant and reliable trend, you generally need more than 5 years' data. True! But the general use of the average death rate for 5 years before and 5 years after some event, however simple and easy of computation, is about as likely to give rise to false conclusions as to true ones. There may be legitimate uses for "before-and-after" averages for popular presentation but before using them they should be carefully examined in the light of the trends within the 5-year periods, in order to be sure that in the particular case it is certain that the true state of affairs will not be misrepresented. In fact, it is questionable whether it would not generally be preferable to show the course of a disease from year to year, even in material destined for the eyes of the "ignorant layman."—Elbridge Sibley, Nashville, Tenn.

The Possible Relationship of Mutual Benefit Associations to the Health of Employes*

H. A. SEYMOUR

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INSURANCE is the modern man's solution of the problem of how to avoid being wiped out prematurely by one of the hazards of life, instead of opposing them with no more than his individual strength and resources.

The first important point I wish to make is the close connection between financial aid for the average bread winner when disabled, and the time required for his recovery. It is very obvious that privation and worry due thereto delay recovery in cases lasting only a few weeks; but there must be added to that the other risk of premature return to work under the lash of necessity, resulting from lack of aid from a sick benefit association.

It is not alone the loss of income, but frequently the special expense of treatment of the disease or the non-industrial accident causing disability which makes the situation acute. Some physicians charge as low as $1.50 for attention to an ordinary case in their own offices, but this varies up to $3.00, and visits to the patient's home cost from $3.00 to $5.00 each. The cost of nursing service, beyond that available in the ordinary family, is prohibitive to all but those in the wealthy class; so that cases of pneumonia and similar diseases among wage earners are almost invariably removed to a hospital where adequate care can be obtained free or at a smaller cost.

Aside from the aid to recovery, the effect of employes' mutual benefit associations upon the health of their members is strongly preventive of avoidable disablement. That is the second big point. This is brought about by sheer necessity, because in the scheme of dues and benefits the association must plan as closely as possible. The former must be low enough and the latter liberal enough to attract healthy members and keep them. Hence, a very careful and alive

* Read before the Industrial Hygiene Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 19, 1928.

administration is essential; claims must be well proved before being paid; and, further, a critical view of the means employed to aid recovery is insisted upon in the interests of all. This leads directly to visits to the disabled, and inspection of home conditions bearing upon their health. It is common knowledge that no efforts in that direction have been exerted by lodges or friendly societies comparable to those which have been made by industry since the idea of its responsibility for the general welfare of its workers developed after the beginning of the 20th century. In fact in some instances, severe criticism of too stringent measures in that direction has been evoked.

We must recognize and avoid the pitfall of paternalism, especially in some of its obnoxious manifestations. But the fact remains that outside of the employer's interest and activity along those lines, the influence of a closely knit mutual benefit association, organized by and among the workers themselves, makes itself felt in the improvement of conditions both in the home of the worker and on the job.

The association has the great advantage of being in a position to refuse benefits where necessary improvements of that kind at home are wilfully neglected. As a direct result, members and their families become educated along lines vital to the maintenance of health. The requirement of a physician's certificate, periodically during the disability, forces people who would otherwise avoid the expense of medical attention to the detriment of their health, to employ a physician, even in short absences. The association's responsible officers know that long disabilities grow out of short disabilities, unless such a course is pursued. All this works toward the education of all of the employes of the industrial concern, in which the association exists, toward habits of health and adequate attention at the onset of disease.

I do not know of a single employes' mutual benefit association in which the employer is not directly interested to the extent of active participation in some way. In large concerns the medical department is a well established modern necessity from the employer's viewpoint; and the assistance in the development of such a department which the employes' association renders is another direct relationship between the association and the health of all the employes.

Well organized medical departments, and also mutual benefit associations of employes, seem to refer especially to big business; but small institutions can really do something along these lines if they will appoint some executive to study their own situations and work out a suitable plan along the lines of health maintenance, with the dual object of maintaining the best personnel efficiency and aiding in the individual welfare of employes.

In fact, in the ideal situation, the employer takes an authoritative

interest in each disabled employe's case, through the operation of rules governing employer's benefits paid (whether through the association or not) in such a way that the employe is fully aware of such payment. To my mind, that is vastly better than payment of the same annual total by the employer into the treasury of the association—an impersonal transaction. The right method improves morale and the relationship of employer and employe throughout the whole organization.

In summarizing the relationships of the mutual benefit association to the health of employes, it will be well to note certain features which appear to be disadvantageous and state the immediate answer to each.

APPARENT DISADVANTAGES

1. *The tendency toward malingering* is encouraged if benefits are too liberal; and that error should be avoided at the beginning, as it is difficult to change the basis afterward.

The general answer to this problem is that malingering is minimized by close supervision, not merely through lay-visiting, but by insistence upon reliable medical inspection, and due regard to moral hazard with reference to the known character of the disabled employe. A check on this sort of thing is to spot repeaters, and treat as recurrences frequent disabilities due to the same cause, in which case the decreasing scale of benefits removes the moral hazard.

2. *There may be an apparent increase in the sickness disability rate* shortly after a benefit plan has been put into operation among a large group of employes.

I suggest that the answer is, in part at least, that the improved health program brings to light incipient disease which must be met by enforced absence from duty, combined with adequate treatment. There is an increased health consciousness in the group, resulting, first, in the more frequent recognition of cause for absence; but if the whole system is adequate, this merely results in better actual health conditions and improved future risks. There are more complete records of health conditions, and of disability absences by kinds and causes; but I submit that it is better to know the truth than to believe, fatuously, that we were formerly better off because more ignorant.

3. *The likelihood of attracting applicants for employment not robustly healthy* and who, therefore, seek employment in business concerns known to have liberal disability benefit and other welfare plans, has been noticed by writers on the subject of employes' benefit associations.

Of course, the answer to this is careful entrance examinations to prevent the hiring of those obviously unfit, in which an important feature is the use of a proper scale of physical classification, aligned definitely with the job analysis of the concern's work. If that is well done, the entrance examination will prevent the acceptance of applicants for and transfers of employes to positions they are not physically qualified to fill.

This leaves open the subject of nervous instability, which is hard to detect by physical examination; and it must be admitted that many people are hired, especially women, by concerns having large numbers of clerks, among whom some troublesome cases of nervous disability develop.

The answer to that is adequate departmental administration. By that I mean that a department manager should learn early in the history of a case of nervous instability that he has such an employe on his payroll, and he ought to be guided by ordinary business principles to eliminate that employe at a suitable time. This policy should be followed with any employe who is in any way sufficiently abnormal to remain below reasonable efficiency after having been labored with, and after having been given genuine opportunity to improve his record. Objections that may be made to this policy are mostly sentimental, because, had the condition been detectable, the entrance examination would have prevented the employment of that applicant in the first place. The association's officers will argue for the sensible administrative policy and, if possible, see that it prevails because of their direct financial responsibility to the association.

SUMMARY OF ADVANTAGEOUS RELATIONSHIPS OF THE ASSOCIATION TO EMPLOYES' HEALTH

1. *More searching and more frequent physical examinations* of employes than will otherwise be made, both at the time of employment and later on, are induced through the association's policy and operation.

2. *Better attention to hygienic and sanitary conditions* in the employer's premises are procured.

3. *Employes are induced to obtain medical attention promptly in apparently simple sicknesses* instead of relying too much on "home remedies," thus shortening these disabilities and preventing their development into long ones (colds into pneumonia, etc.). Although this is a hard thing to accomplish, the coöperation of the association and the employer in demanding a physician's certificate of disability and of medical attention, if benefits are to be paid for short sickness disabilities, will succeed in this object.

4. *The duration of lengthy sickness disabilities is curtailed* by better medical attention, and because of less worry and privation.

5. *Complete recovery before return to duty* is not only permitted by the alleviation of the financial burdens of disability, but is enforced, the association compelling its members to obtain the medical department's discharge. Frequently the association officers, in coöperation with the industrial management, aid in finding appropriate light work, or part-time work, for those who would otherwise have to remain off duty still longer to avoid a relapse with its attendant evils.

6. *The same advantages of policy operate directly to cut down the death rate* among employes.

7. *Employes whose home living conditions are below par are encouraged to improve them,* and to seek better quarters, if necessary.

8. *The association officers will assist in obtaining adequate treatment more speedily* in lengthy cases requiring institutional care, such as tuberculosis, neurasthenia, etc.; and in obtaining, if necessary, special financial aid required for a change of climate, for example. This results in better recovery, or in enabling the member to settle in another part of the country.

9. *Health records of all employes are more completely kept,* and can be better studied and the needs of each and all understood. This enables general improvement by comparison of sickness experience with other associations throughout the country.

10. *A very definite health program, with the active coöperation of the em-*

ployer, through an adequate medical department, is included in any sound plan establishing a mutual benefit association of employes.

11. *A medical department already established is encouraged to develop its work* to the point of greatest reasonable efficiency by the required coöperation with the employes' mutual benefit association when *it* is established.

12. *The health program is stimulated where it needs it most* by establishing a competitive basis between occupational exposure groups. This can easily be done in large organizations where employes are engaged in widely different kinds of work by organizing the benefit association into sections, by such groups, with reference to disability funds only.

13. *Health-mindedness throughout the whole organization is stimulated, and good health is promoted,* by the publication of various items in the employes' magazine or newspaper illustrating the benefits of membership; and by the publication of association reports and health items prepared by the medical department.

14. *Health insurance helps to create the habits of thrift* in other directions, resulting in improved living conditions among the lower paid classes. Health makes thrift and thrift makes health.

15. In general, every well managed mutual benefit association, by contributing its quota to the health of its community, assists in the general social economic advancement of society. This country's loss of a quarter of a billion dollars annually, due to sickness, is largely a direct loss to productive industry. The more health insurance spreads throughout the nation, the greater our prosperity and the better off we shall all be.

Mobilizing Mutual Benefit Associations for Health*

MAGNUS W. ALEXANDER

President, National Industrial Conference Board, New York, N. Y.

AS originally conceived, industrial medical work was primarily curative rather than preventive. It filled a great need in industry by providing suitable treatment for the injured and sick and also by preventing, through careful treatment and follow-up, aggravation of injuries and prolonged periods of disability. But its object was essentially the repairing of the damage already done. In its advanced form, medical work in industry seeks to eliminate the cause rather than merely to mitigate the consequences of injury and illness; to hunt out and eradicate incipient disease instead of waiting for the disease to develop before attacking it. But the plant physician cannot usually accomplish this unassisted. He comes into contact normally only with those who need his services quickly, and his time is usually so fully occupied with the injured and sick that he has scant opportunity fully to develop the preventive possibilities of his position.

In establishments which have no plant physician, even on a part-time basis, there is all the greater need for some agency to assume the initiative in sickness prevention and in an effective campaign for health preservation. Fortunately, in many plants an agency appears ready at hand which can easily be adapted to just such a purpose; in others it can readily be installed. The average employe quickly responds to a proper appeal for his coöperative attitude, and in order to make and sustain an effective appeal—made more difficult by the increasing dimensions of individual industrial plants—and to secure coöperative harmony in the conduct of business enterprise, organized programs of industrial relations activities have been developed which have successfully passed through the stages of experimentation until in many establishments they have now become an integral part of administrative procedure.

THE MUTUAL BENEFIT ASSOCIATION AS AN AGENCY FOR HEALTH WORK

Among industrial relations activities, one stands out as being rather unique because it is composed of, and usually officered and operated by, the employes themselves. Mutual benefit associations, as the

* Read before the Industrial Hygiene Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 18, 1928.

name implies, are organized for the mutual benefit of the plant employes who have banded together in such associations and, however much or little attention and financial assistance management may devote to them, they are essentially the employes' own organization. A study of mutual benefit associations indicates that the main thought among workers in forming them, and among management in assisting their formation and conduct, has been the desire to establish a systematic coöperative means of securing for their members some measure of protection against loss due to accident, illness or death, in addition to the protection afforded by workmen's compensation laws or other means.

Broadly considered, the mutual benefit association is a mutual insurance venture in which the dues of the members and the contributions by the employer, where made, correspond to the premiums paid by policy holders to regular insurance companies, and the relief benefits of the former correspond to the insurance payments of the latter. With the recent growth of group life, and sickness and accident insurance, some of the mutual benefit associations have transferred their insurance risks to regular insurance companies, thus relieving themselves of their function of offering sickness, accident and death benefits to their members through coöperative methods.

Whether this procedure is in the interest of the employes composing the mutual benefit associations and of the associations themselves is a moot question. No doubt, it increases the certainty of benefit payments, since in the case of an insurance company, premium payments and benefit payments have a sound actuarial relationship, a fact which is not always true of mutual benefit associations.

As a matter of fact, I know of no case where a member of a mutual benefit association suffered a loss of benefits due him, for either the association fund was adequate to make the payment or the employing company made up the deficiency if it occurred. On the other hand, by transferring its insurance service to a regular insurance carrier, the mutual benefit association ceases to function for the very purpose for which it was organized, and replaces a strongly personal relationship among its members, especially in times of individual distress, by a more or less impersonal commercial proposition. Moreover, there is a question whether in the long run the mutual benefit association would not prove less expensive to its members than a regular insurance carrier, because usually the employing company, rather than the mutual benefit association, assumes the cost of administrative expense, and because experience has shown disability and death benefit requirements to be much more infrequent than actuarially determined

insurance payments are designed to provide. It is also reasonable to assume less malingering among the members of a mutual benefit association carrying its own insurance risks than among the same group of people insured by commercial insurance carriers. As already stated, this whole question, largely because of its newness, is still a debatable issue, and I wish here only to point out that, while on the one side there may be a gain in security and amount of benefit payments, there may also be on the other side considerable loss of psychological values.

But whether or not a mutual benefit association transfers its insurance risks to an insurance carrier, a new and useful field of activity is opening for these associations. Not only can a mutual benefit association be instrumental in promoting and coördinating the social and recreational activities of the employes in an establishment, and in these and similar ways serve as a valuable point of contact between management and the employes collectively, but the benefit association, organized and managed by and possessing the confidence of its members, is ideally equipped to sponsor a movement and carry through an effective program in the interest of the health of its members and their families.

REQUIREMENTS FOR EFFECTIVE HEALTH WORK

The basis of preventive health work is the physical examination through which physical defect and incipient disease can be ascertained and subjected to appropriate curative procedure. In this respect, mutual benefit association requirements for admission and maintenance of membership are far below what they could be. In a study of 382 of these associations, the National Industrial Conference Board found that the basis of membership in 58 was merely a statement by the applicant that he was in good health, while in 86 associations membership eligibility was dependent upon the results of a physical examination made by the employe's physician, a physician designated by the association, or the regular plant physician. Only 3 associations, or somewhat less than 1 per cent, provided for periodic physical reexamination.

Moreover, those associations which look to insurance carriers for payment of benefits to their members under a group insurance plan do not now require a physical examination for membership eligibility, since the original purpose of such examination—to limit the association's financial liability by excluding those likely to cause a severe drain on the treasury—no longer prevails, and under group insurance no individual physical examination is demanded.

The main purpose of the physical test in industry is to determine

the worker's fitness for a particular task, as well as to discover the more obvious symptoms of disease which may make him susceptible to accident and result in high benefit cost, or which may affect the health and safety of other employes in the plant. From the standpoint of the mutual benefit association, however, as already stated, the purpose of the physical examination, where required, is to limit the financial responsibility of the association.

In contemplating this issue, two questions arise: First, should all employes in a plant be required to join the mutual benefit association in that plant as a condition of securing and maintaining employment? and, second, should all members of the mutual benefit association be required to undergo a physical examination and a periodic reëxamination as a *sine qua non* for securing and maintaining membership?

Valid arguments can be presented on both sides of these questions. My own experience and studies lead me to the observation that it would seem unwise at the present time to introduce the feature of compulsion in either of the two cases. While it would seem desirable that at least in each industrial plant of larger size, perhaps generally in all plants in which 250 or more wage earners are regularly employed, there be a mutual benefit association, it would also seem the part of wisdom not to force the employes to join an association to which they would be compelled to make regular financial contributions, but rather to make the mutual benefit association so effective and helpful in its economical operation that at least the great majority of the employes would voluntarily join. When this much is accomplished, these employe members may then properly ask the management to enforce membership in the benefit association for all plant employes with more than a month's employment duration. The latter provision would be necessary in order to exclude casual workers.

The management could then, in turn, issue a rule to the effect that upon the request of the mutual benefit association in the plant it would in future require all new employes to join the association and abide by its rules and regulations. I know that such a scheme is in successful operation in several industrial plants. It is obviously desirable to bring all employes in a plant into the mutual benefit association, for its benevolent influence would automatically become available to all employes and the management could more appropriately utilize the association as a means of contact.

I feel that physical examination and particularly physical reëxamination as a basis of membership in a mutual benefit association should not be made compulsory at the present time, but that the association should through its educational campaign, and in close coöperation with

the management and the plant medical department, where one exists, encourage its members, in their own interest and that of their fellow workers, to subject themselves to a physical test. Such persistent educational effort, if intelligently carried on, would gradually overcome the natural reluctance of the association members to avail themselves of the benefits of a physical examination, while it should also offer an added incentive to voluntary membership in the benefit association.

If my reasoning is sound, it follows that by tactful and intelligent procedure the desired end—the inclusiveness of mutual benefit association membership in a plant and of physical examination and reexamination of all its members—will in time be accomplished without creating the opposition, with its unfavorable reactions upon the employment relation and even upon the conduct of the enterprise, that might otherwise develop.

The mere requirement of initial physical examination will place upon the mutual benefit association a considerable amount of clerical and follow-up work, and this will be many times multiplied by any enforcement of periodic physical reëxamination. Whether the mutual benefit association should develop the required clerical service, with resultant increase in the expense of operation, and change the character of the association from one of voluntary to one of paid assistants, is also a question worthy of very careful consideration.

The mutual benefit association should first of all devote its efforts toward educating and encouraging its members and other plant employes to join in an effective campaign for good health through personal hygienic and sensible living, prompt attention by competent physicians or nurses to incipient disease and injuries, proper initial physical examination and check-up reëxamination, and through other means that will lead to the same end. Moreover, the mutual benefit association should coöperate closely with the plant medical department, where such is in operation, and in conjunction with the plant physician select local physicians in harmony with its program whom it could recommend to its members for physical examinations and medical treatment. It should prepare and distribute to its members suitable health literature and arrange lectures and talks on the subject; should by other coöperative means strive to overcome the natural inertia of most people to take proper physical care of themselves; and seek to make each member an active health worker for himself, his fellow workers and his family. Where no plant physician is available, the same general procedure should be followed in coöperation

with a carefully selected local physician or a group of physicians who would be known as the association's physicians.

It would seem obvious that in a plant where a physician is regularly on duty, either for full-time or part-time service, he should make the physical examinations at the expense of the employing company, especially since in many plants, with organized medical service of larger or smaller scope, applicants accepted for employment must already have satisfactorily passed a physical test. It is becoming increasingly recognized that the employer has a right to demand such initial physical examination, in the interest of the new employe, the protection of his fellow employes, and also in the interest of the employer. The tact with which employers and their plant physicians have handled this matter has practically completely overcome the earlier antagonism. Compelling employes in service to subject themselves to periodic physical reëxamination may create a new feeling of opposition, especially if a physician engaged by the employer is to make the physical test, because of the fear of the employe that the detection of a physical defect or incipient disease would throw him out of employment. Even if the employe member of a mutual benefit association were allowed to choose another than the plant physician for his physical reëxamination, the mutual benefit association should require that the choice of the examining physician be made from a list of physicians approved by the association and that the examination be in accordance with an approved plan; otherwise the physical examination might in many cases become a mere sham. In any event, the management of a plant should proceed with due caution and tact, in order to remove all basis for fear on the part of the employes that the physical test may tend to deprive them of employment rather than to improve their physical condition. With an atmosphere of confidence thus created, members of a mutual benefit association would readily turn to the plant physician for physical examination without cost to themselves, or to a physician approved by the mutual benefit association, whose services are available at a reasonable rate.

The physical reëxamination of an employe should be different from the examination of an applicant for employment; and by making the former essentially for the purpose of applying such curative measures as will enable the employe to continue at work, much will be gained in removing the opposition to periodic examinations and in making employes seek medical assistance which will prolong their life of productive usefulness.

Experience has shown that diseases which cause the greatest amount of loss of productive time are mostly preventable. A study

conducted by the U. S. Public Health Service, based upon reports from mutual benefit associations covering 114,065 industrial workers employed in different industries in 1924, shows that 10,948 disability cases among the members of those associations resulted in lost work time of 8 days or more. The leading causes of such disability were influenza and grippe, these accounting for 18 per cent of the 10,948 sickness claims. The report states that during recent years no other diseases have been so disastrous from the standpoint of interrupted production, wages lost and cost to mutual benefit associations. For the 5-year period ending December 31, 1924, the U. S. Public Health Service found that the frequency rate of these diseases was 6.6 times that of the epidemic, endemic and infectious diseases against which health work is so largely directed. Compilation of the annual incidence rates for different diseases in disease groups for this 5-year period reveals that respiratory diseases, including influenza and grippe, pulmonary tuberculosis and diseases of the pharynx, accounted for 47 per cent of all the sickness cases. These figures indicate what could be accomplished through the practice of preventive measures which so strongly influence the incidence of these diseases.

CONSTRUCTIVE POSSIBILITIES OF MUTUAL BENEFIT ASSOCIATIONS

If the mutual benefit association is to fulfil its possibilities as a health agency, certain changes must be made in its point of view and in its operation. First of all, it must turn from an attitude of payment for disability or death to an outlook and effort for their prevention or postponement. It must realize that, while assuring its members relief when they are disabled, it will be performing a vastly greater service by preventing the need for such relief. It must recognize that, in promoting the health of its members, it is serving their best individual interests, and that the general improvement of health in the plant will also reduce benefit claims on the association and, consequently, enable individual benefits to be increased or individual membership dues to be decreased. It should encourage adequate initial physical examination and periodic reëxamination as the basis for effective prevention of disease and for conservation of health, and to this end coöperate in every practical way with the medical department of the plant, if there is one, or in connection with the plant management assume responsibility for making competent medical attention and consultation service available to its members at reasonable expense to them. It should, furthermore, coöperate in the efforts for safety of work shops and work operations toward a reduction of accidents, since disease is often greatly aggravated by the condition of the

body following accidents. In stimulating its members to the observation of practical and simple rules of health and hygiene, it should also induce them to carry this work home to all the members of the family. In particular, it should emphasize the importance of developing in the children habits that are conducive to good health in order that they may later on be enabled to undertake life's work without physical handicaps.

But even beyond the confines of the individual plants, mutual benefit associations could properly coöperate with local organizations, like chambers of commerce, and with other mutual benefit associations for the purpose of stimulating community health work and in order to have a skeleton machinery at hand which can readily function in case of a serious epidemic or a catastrophe. It may even prove advisable, as time goes on, to bring the mutual benefit associations in various industries or communities or states, or eventually in a nation-wide way, into close relationship for the purpose of making the work of the individual associations more effective and extending the joint beneficial influence as far as possible into all community life.

It goes without saying that the greatest care must be exercised by mutual benefit associations, by industrial management and in all cooperative relations here suggested, to avoid any appearance of paternalism or commercial exploitation.

DISCUSSION

Meyer Bloomfield, New York, N. Y.—Most of the mutual benefit associations were formed before the war and are stagnant today. Most of them make no mention of health in their inquiries or records. They are merely substitutes for "passing the hat" when someone dies. It is a Victorian age in which they exist. Mr. Seymour's presentations are of the big plants and large groups, but the stagnation of most of these associations is really alarming. Turning these matters over to insurance companies really does impersonalize them and it causes their value and purpose to be lost sight of. However, the insurance company scheme may be better in many situations. There are no statistics to support either side so far as I know at present. We should ask the mutual benefit association what it exists for and what dividends result from its existence in regard to health and to the prevention of disease. If you ask the foreman what to do with a man found asleep on the job he would say "fire him," but the mutual benefit association ought to inquire why he was asleep. Oftentimes the management needs a shaking up. A few months ago Mr. Hunt and others started an organization to overhaul the mutual benefit associations and we may expect results. The health responsibilities of these associations have great possibilities if developed correctly.

E. B. Hunt, Pennsylvania Railroad, Philadelphia, Pa.—Let us not permit the mutual benefit association to dry up by turning it over to an insurance company. It loses its interest. The Pennsylvania Railroad Association is a great factor in harmonious labor relations. It is now 42 years old. Its benefits and other ac-

tivities have often been increased and greatly extended. Back of everything is health. Only certain employes are compelled to take physical examinations. Last year there were 48,000 such examinations. These are required once if a person is 40 years of age or above and every year for certain persons who are 42 years of age or over. Certain objections may have existed at first but have long since disappeared. The whole procedure is welcomed by the labor organizations, whose members support it in the interest of public safety as well as the promotion of their health and well-being.

Volney S. Cheney, M.D., Armour & Company, Chicago, Ill.—We have no mutual benefit association at Armour & Company although I can see where such might possibly help. However, I believe that these matters are outside of the plant management. They are best conducted by outside agencies with certain cooperation from the plant. Let the plant see to bettering working conditions in the plant. The tendency is now for the plant to drop outside welfare work. We used to do it. We have dropped it gradually during the past 7 years. The results were good but the moral obligation was bad. Our business is meat packing first, and the health of our employes second. Our product is made up of the ability and good health of each worker. It is up to each worker to supply these. We cancel contracts if goods are not up to the requirements. We should do the same in hiring and keeping a worker. He, and not the industry, must furnish health, so far as his personal liability is concerned. The natural inertia in these matters does really exist, but the worker must expect to look after himself or lose his job. The mutual benefit association's object should be continuous and not just for certain times or things. We have the group insurance plan and thus far all has gone well. The insurance company furnishes the nursing service and coöperates with our plant medical service. The medical department should be fraternal and not paternal. Let outside agencies be paternal and do not expect such an attitude from an industrial medical department.

Eugene L. Fisk, M.D., Life Extension Institute, New York, N. Y.—A chief antidote to sickness is obtaining the individual's interest in himself. Dr. Cheney's line of demarkation is rather too sharp. There is a universality of interest; for example, if the employe is malingering, the employer is interested. I do not believe the employer can dismiss his interest in the health of each of the individual employes.

Francis D. Patterson, M.D., West Philadelphia, Pa.—I am surprised at Dr. Cheney's remark that a man who does not maintain his health should leave the industry. We are our brothers' keepers. Most of our employes do not know how to keep their health. Often they are too ignorant to know what to do and how to do it. Hence, the employer must assume certain obligations when he employs them if he is to gain the desired end in his own business. It is a folly to have a mutual benefit association and not physical examinations, including the repeating of them. It is a fool's paradise to live in ignorant bliss of disease. I recall that 21 years ago Samuel P. Gompers said that physical examinations had for their chief purpose the "firing" of men, but our answer was that no epileptics, heart disease cases, etc., could be employed or be continued to be employed on railroads, on cranes, etc. The mutual benefit association has a big opportunity.

Wade Wright, M.D., Metropolitan Life Insurance Co., New York, N. Y.—The wise employer, even as an expedient, must recognize the health responsibility he has for his employes. The mutual benefit association is a baby insurance company and, as such, is unsound (you all know that I am an insurance company man). It

is like the baby pop-stand compared with the luxurious catering establishment. In the former, mother finances the scheme. The business of an insurance company is simply to distribute cost in a sound manner. Most mutual benefit associations are very unsound and inadequate. The insurance company requires that malingering would have to be supported by a physician's certificate, and we take care to appoint honest doctors. Where health benefits are provided, they are to help prolong physical activities rather than to prolong life. The worker needs help for financial support while sick, for diagnostic facilities and associated things, and here lies the field for the mutual benefit association rather than dabbling with insurance. Through a good insurance company an employe can be put in the best hospital and receive the best facilities and care for not over $10 per capita per year, where the cost to a "white-collar" man, acting singly, would amount to $1,000. If such an average "white-collar" man were a saver, such a bill would take him 100 years to pay. If he belongs to a reliable insurance company he may get the same care for $10 a year. Our group insurance requires no physical examinations, but this is because insurance has nothing to do with physical examinations; such belong to another category than insurance.

George H. Wood, M.D., Frederick Stearns & Co., Detroit, Mich.—Dr. Cheney should have been a lawyer in Franklin's time. I am sure that compensation insurance is not in accordance with common law since primarily the worker assumed all risks. I think Dr. Cheney's reasons are logical, but we must do this so-called paternal work. Why? The average employe does not have sufficient income, and hence our efforts to help him in times of distress are really substitutes for low wages, which substitutes, however, are spent in a wise way.

Surgeon General Hugh S. Cumming, U. S. Public Health Service, Washington, D. C.—I am certain that Dr. Cheney's position and Dr. Wood's "fellow servant" ideas have quite completely disappeared in America's industrial relations.

Meyer Bloomfield—I am a lawyer and I must defend my profession. The law has learned something in a century. It is progressive and not continually primitive as many think. It is true that law learns slowly but in a century it has discarded the "fellow servant" and the "assumption of risk" ideas and many equally as bad.

Eugene L. Fisk, M.D.—It seems a paradox that what a man continually preaches he is often accused of never mentioning: I have repeated and repeated that the purpose of the Life Extension Institute is to extend the usefulness of life and not merely life itself.

Volney S. Cheney, M.D.—I want to explain my position more clearly. We get tired telling people what to do and not having them do it. We must resort to compulsion. As a matter of fact, we advance no key-man in our organization without a physical examination, but we are stressing that each man owes most to himself.

Bacteriophage From a Public Health Standpoint*

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DESPITE the enthusiasm which has been evidenced by most investigators who have undertaken therapeutic work with bacteriophage, the use of this principle has not spread and a study of the literature of the past two years indicates a decrease rather than an increase in its use. In seeking the cause for this decline, it is necessary to present the fundamental conceptions upon which bacteriophage therapy depends.

A substance capable, even in extremely small quantities, of killing and of dissolving the bacteria with which it comes into contact and which at the same time is harmless to animal tissues, should have an immediate application to sterilization of body cavities in which bacteria are present. Unfortunately, however, although a principle might be obtained capable of killing and dissolving, let us say, *B. coli*, its action is generally confined to the single strain of *B. coli* in question. A bacteriophage race which will attack one strain of this organism will not necessarily attack another strain. Furthermore, although dissolution can be demonstrated without difficulty, prolonged incubation of the dissolved culture results in the appearance of new growth. This growth, while still *B. coli*, will not be dissolved by the bacteriophage which at first attacked it. Such a culture is termed resistant and, although a new race of bacteriophage may dissolve it, the discovery of such a race is not always an easy matter. It has been further shown that these resistant cultures are more virulent than their susceptible ancestors or precursors. By using bacteriophage races of high virulence, however, the production of secondary cultures may be reduced, if not eliminated.

This outline is essentially the foundation upon which earlier experimenters based their hopes for bacteriophage therapy and, indeed, it is sufficiently alluring at the present time, for it contains within it the explanation for the successes as well as for the failures attending bacteriophage therapy to date. It does not require much exercise of the imagination to attribute to a weak race of bacteriophage most if

* Read before the Laboratory Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 18, 1928.

not all of the failures in therapy. When we have reviewed the results obtained by workers using this conception as their foundation for therapeutic procedures it will, I think, be apparent that the results obtained illustrate the fundamental soundness of the theory. It should then be as attractive today as it was five years ago. If it is not, the reason can only be that the results of practice have failed to justify the hopes based on the theory. That such is not the case, but rather that unfair, biased interpretations have been derived from a failure to consider all of the evidence will become apparent as we proceed.

The infections to the cure of which bacteriophage has been applied are now rather numerous. They include bacillary dysentery, typhoid fever, cystitis and pyelitis, plague and cholera, gonorrhea, and various infections due to staphylococci and streptococci. The enteric diseases, infections of the urinary tract, and staphylococcus infections in general have received by far the most attention.

In so far as dysenteries are concerned, it must be admitted that a mere statistical study of the results reported would justify a rejection of the principle as a possible valuable agent in treatment. Critical analysis of the reports however would inject an element of doubt into this conclusion, for it would be seen that results obtained with dysenteries caused by the Shiga bacillus were better than were those where the Flexner or other strains were concerned. Furthermore, nationality of the investigators has played an important rôle in the results reported. The German investigators have obtained negative results, the French positive, while the British and North Americans have been more or less neutral. From South America, however, comes the greatest support for the principle. Although actual figures are not available, Da Costa Cruz reports very favorable results attending the widespread use of Shiga bacteriophage.

Treatment of typhoid and paratyphoid fevers gives similar conflicting results depending again upon the nationality of the users. About all that can be gained from a study of the literature is the impression that, should the reader be so unfortunate as to contract the disease, his first request would be for a potent race of bacteriophage.

In urinary infections the picture is more distinct, and the results are more clear cut. Whatever criticisms one may have as to the convincing nature of the results, it must be admitted that of those who have administered the treatment none has given an unfavorable report. Although exact figures are not available it may be estimated that several hundred treatments for urinary infections have been given with universally satisfactory results. The same remarks apply to treatment of staphylococcus infections of all types. The unanimity of the conclusions, even deducting for optimism, is striking.

With respect to the remainder of the infections mentioned above, even the most ardent advocate of bacteriophage must withhold conclusions. At most, they but add to the interest in the question.

If, in addition to the above information, one is conversant with the work now being carried on and as yet unpublished, he is likely to become convinced that the bacteriophage has inherent possibilities as a therapeutic agent. Such workers as Cowie, Rice, Caldwell, Dutton and others, although not so well known perhaps as Davison (the only worker in this country to publish an unfavorable report as a result of personal experience in bacteriophage therapy), have a great deal of work to their credit, some of which has been published in journals with limited circulation, but much of which has remained unpublished.

But I do not advocate bacteriophage for therapeutic and prophylactic purposes because I have read much about it, nor yet because I happen to know about work that has not been published. I believe in this principle because of my own experience in its use during a period of five years. Most recently I have been concerned with the application of staphylococcus bacteriophage to the treatment of furunculosis, acne, and osteomyelitis. Already a report has been published of the treatment of 66 cases of furunculosis with striking results. These have been continued, until today records are available of more than 300 cases of furunculosis, more than 50 cases of acne, 8 or 10 cases of styes, and several cases of osteomyelitis.

There is not space, nor am I prepared to give concrete data on these treatments. They will appear in due season in the literature. But the results are sufficiently striking to cause reputable physicians, men of years of experience in practice, men usually cautious in their reactions to therapeutic agents, in submitting their reports to use such adjectives as "wonderful," "striking," "remarkable." This does not warrant the wholesale distribution of bacteriophage or the sale of the agent as a new specific; I would be the last to recommend such a thing. That it does warrant continued investigation I insist.

Before passing from this question of my personal experience with staphylococcus bacteriophage, I would like to inject a consideration of the fundamental conceptions upon which this work is based. Unlike the earlier work the bases for which I have already described, these treatments were designed to bring into operation two observations made long after the discovery of the bacteriophage. I refer to the antigenic action of bacteriophage-lysed cultures, and to the antivirus of Besredka. With respect to the first, it has been shown by many investigators, notably d'Herelle, G. H. Smith, Nelson, and Arnold, that bacteriophage increases the opsonic index to an unbelievable degree

and that filtrates of bacteriophage-lysed cultures can produce all of the antibodies produced by the same cultures when killed by heat and to approximately the same degree. It is necessary, however, in stating this fact to bear in mind that in none of these experiments has the bacteriophage been separated from the bacterial proteins resulting from its action. Whether the bacteriophage or the proteins are responsible for the reactions it is impossible to say.

So far as the antivirus is concerned, it must be pointed out that here we are dealing with two factors, a product and a method. The product is a filtrate of old bacterial cultures; the method is that of local immunization; that is, the filtrates are applied directly to the tissue infected. Bacteriophage is likewise a filtrate. To what extent it is identical with antivirus is as yet undetermined, but the method of local immunization may be used with the bacteriophage as well as with antivirus.

Thus it has come about that instead of believing, as did the earlier workers, that it was necessary to have a bacteriophage capable of lysing *in vitro* the organism with which a particular patient was infected before successful therapy could be accomplished, and feeling that actual contact of bacteriophage and organism should occur in the tissue or cavity infected, I have felt that all that was necessary was to have staphylococcus protein as produced by bacteriophage inoculated into the patient, or, according to the type of infection, applied locally.

This changed conception as to the possible rôle of the bacteriophage in treatment has led to a consideration of its use in prophylaxis. Although, apparently, public health officials and workers are irrevocably committed to the use of so-called typhoid vaccines, it is debatable whether their trust is well placed. I think there will be no opposition to the statement that no biologic product for the promotion of immunity is entirely satisfactory or beyond improvement. If this is the case, nothing more is needed to justify an investigation of a substitute for the well known vaccine, while the road along which such an investigation should proceed has been suggested in the consideration of the basis for the therapeutic work with staphylococcus phage.

Lysed bacterial cultures are antigenic. Because of this fact I undertook a study of the results of human inoculations with filtrates of lysed cultures of *B. typhosus*, *B. paratyphosus A*, and *B. paratyphosus B*, and immediately learned that doses of bacteriophage as great as 4 c.c. could be given subcutaneously or intramuscularly without more reaction than would accompany the administration of a similar amount of saline, that is, a slightly sore arm. This is the first respect in which bacteriophage-lysed cultures differ from the usual vaccine. In about 200 injections I have not had a single reaction.

Comparative studies of response to inoculations with vaccine and with the bacteriophage lysates have been carried on for many months with the following results:

The agglutinin production following inoculation with bacteriophage lysates is practically identical with that following the vaccine inoculations although it is more rapid. Bactericidal action of the blood of those inoculated with lysate a month previous was consistently higher than that produced by the vaccine. One month after inoculation the opsonic index of the serum of those receiving the lysate was about double that of the individuals who received vaccine. The number of inoculations involved is now more than 200, about equally divided between lysate and vaccine. Much remains to be done and much has been done that I prefer not to mention at this time. Certainly the duration of this immunity, if such it may be called, is most significant.

No experiment that depends upon serological response as a determination of immunological value of an agent is adequate. Especially is this true of the bacteriophage. Such evidence as we have points to the fact that the degree of immunity resulting from use of bacteriophage is out of all proportion to the antibody response demonstrable. The bacteriophage possesses several characteristics which, could the immunity resulting from its use be shown to be even equal to that produced by the vaccine, justify, indeed demand, its substitution for that agent. These are: Freedom from reactions, a factor of inestimable value when it is considered that one of the chief objections to inoculation is the discomfort amounting to disability in some cases; the ease and cheapness of production; the variety of antigens which may be included; and the availability of the prophylactic agent as a therapeutic agent in case of epidemics.

Besides the advantage of lessening the objection to typhoid inoculations, the fact that bacteriophage lysates produce no reactions has another advantage. It is possible to give much larger doses, a fact which might serve to reduce the number of injections required.

As to the ease and cheapness of production, it is only necessary to state the methods used in these experiments to indicate possibilities:

To a gallon bottle of peptone water, three slants each of typhoid, para A and para B are added, and about 10 c.c. of bacteriophage. After 24 hours' incubation the broth is clear and is filtered to prevent the development of secondary cultures. The flask is then re-inoculated. This is repeated a third time. The amount of bacterial protein contained is thus very many times that found in a vaccine containing 2 billion organisms per c.c., while the only labor involved is the filtration—not an hour's job with a Seitz filter—and this may be omitted.

One question which may be anticipated at this point concerns the use of preservative. None has been used in the bacteriophage utilized for these experiments, and it is preferable that none be used since it destroys the possibility of using the bacteriophage for treatment. Phenol, moreover, decreases the potency of the bacteriophage without

entirely destroying it. It is possible that some other prevention for bacterial contamination may be employed.

Since the amount of bacterial protein that may be accumulated in these filtrates without causing reactions when they are injected is not narrowly limited, it is obvious that, providing the bacteriophage used will give lysis, several bacterial species might be included in the lysate. Shiga dysentery lysate, in particular, could be employed since filtrates of this organism when lysed are non-toxic. Enteritidis, indeed all of the salmonella group, might be added. The bacteriophage used is lytic for all of these organisms. Thus a single injection or at most three injections might serve to immunize against all enteric infections.

I come now to a justification of my title, "Bacteriophage from a Public Health Standpoint." To one who has given the least thought to this problem it appears that in bacteriophage we have a potential therapeutic and prophylactic agent for the control of epidemics—for the control of infectious disease. Have we not likewise a duty? The health departments of states and cities were early advocates of all of the better known and more widely used biological products; if they doubted the value of the principle, they at least gave it a fair trial. Why not then bacteriophage? I venture to state that as much justification now exists for the use of bacteriophage by the public health departments as ever existed for the use of scarlet fever toxin or antitoxin. The difference is this, that we have no bacteriophage for measles, for poliomyelitis or for encephalitis. In brief, for those diseases in the control of which we have no satisfactory or readily used cure or preventive, no bacteriophage has been developed. But does this excuse us from improving upon the agents now in use? Because furunculosis is not contagious is it less a function of the health department to promote the development of a measure which may relieve considerable suffering? Moreover, until the principle that bacteriophage or the antigens that bacteriophage makes available is accepted as applicable to the cure or prevention of any given infection there is little incentive to develop new bacteriophage. Why strive to develop a lytic principle which may be turned to the treatment of streptococcus infections if we are unable to secure a hearing for the staphylococcus bacteriophage? I only plead for a fair trial for a principle which under most difficult circumstances has more than demonstrated its potentialities. Make no hastily considered changes; put no product into general circulation; but make available the great resources at your command for the trial of bacteriophage.

Vital Statistics and the Measurement of Health Progress Fargo, N. D.

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PUBLIC health services in Fargo, N. D., underwent rapid expansion in 1923 following the establishment of the first of the Commonwealth Fund child health demonstrations. A full-time health officer, the first in any North Dakota community, replaced the part-time health officer of the pre-demonstration period. More public health nurses were employed, as well as a pediatrician, a health educator and (in 1927) a public health dentist.

As a means of discovering if possible the effect on the status of community health from this increased volume of public health activity, much attention has been given in Fargo to the study of vital statistics, growth changes in children, and other data which seemed likely to yield definite information as to the nature and extent of health improvement.*

In the use of vital statistics in the measurement of health progress desirable procedures in analysis and interpretation proved exceedingly difficult to formulate. Many local births and deaths are of non-residents, and whether or not they should be included in measurement tabulations was a matter of much importance. In a city with but 26,000 population, births and deaths each year are few, and variations in yearly rates have little significance as an index of health change. Complete and accurate registration extends back only a few years before the establishment of the demonstration, and as yet trends in local vital statistics can be determined with reference to only a very short period of time.

Procedures were finally worked out which seemed adapted to the analysis for measurement purposes of the type of vital statistics at

* For detailed description of demonstration organization and accomplishments, see Fargo Final Report—Part I, Five Years in Fargo; Part II, Public Health Work in Fargo; An Appraisal by W. F. Walker, D.P.H.; Part III, Serving the Child in Fargo. Copies may be secured on application to the Commonwealth Fund Division of Publications, 578 Madison Avenue, New York, N. Y.

present available. The methods used in this phase of the Fargo measurement program are described in considerable detail in order to serve the needs of public health administrators and others facing similar problems of analysis elsewhere. Certain of the more important findings from these studies are also included as illustrations of what it proved possible to learn from the analysis of vital statistics concerning recent changes in local health conditions.

Under the Vital Statistics Law in North Dakota the responsibility for the local registration of births and deaths rests with the city auditor or the village or township clerk, but in Fargo beginning with the demonstration period duplicate copies of certificates were kept on file in the office of the City Health Department. All certificates were carefully checked and physicians queried as to doubtful entries. Tabulations for monthly and annual reports were made routinely under the direction of the demonstration statistician, and these were supplemented by special studies when necessary, such as in the detailed study of infant mortality.

While the city was admitted to the U. S. Death Registration Area in the year 1916, its inclusion in the U. S. Birth Registration Area was not possible until 1924 when the whole state of North Dakota was able to qualify for admission to both the birth and death registration areas. Study of local standards in reporting, however, showed that beginning with 1920 records of both births and deaths were sufficiently complete to justify dependence upon them for measurement purposes, and tabulations similar to those for the demonstration years have been made from data in the birth and death certificates on file in the office of the State Department of Health.

Fargo is the hospital center for a large surrounding area in North Dakota and Minnesota. Within the city also are located several small institutions for unmarried mothers and dependent children where care is given to both residents and non-residents. It is therefore not surprising that the number of non-resident births and deaths during the years covered in this study has been nearly the same as resident, as shown in Table I. This proportion has fluctuated somewhat from year to year so that total rates including non-residents have not been affected uniformly by the factor of non-residence.

Total death rates and birth rates, as illustrated in Figure I, are quite different if non-residents are included or excluded. Both the birth rates and death rates when calculated with reference to residents only are about the same as recent rates for North Dakota and Minnesota. If non-residents are included, they become abnormally high.

Local observation indicates that relatively few births and deaths

TABLE I

BIRTHS AND DEATHS INCLUDING AND EXCLUDING NON-RESIDENTS FARGO, N. D., 1920–1927

	Number			Per Cent		Rate		
	Total	Resident	Non-resident	Resident	Non-resident	Total	Resident	Non-resident
Live Births						(Per 1,000 population)		
1920....	702	443	259	63.1	36.9	31.6	19.9	—
1921....	732	497	235	67.9	32.1	32.1	21.8	—
1922....	731	513	218	70.2	29.8	31.3	22.0	—
1923....	768	517	251	67.3	32.7	32.1	21.6	—
1924....	783	500	283	63.9	36.1	32.0	20.4	—
1925....	810	486	324	60.0	40.0	32.3	19.4	—
1926....	846	492	354	58.2	41.8	33.0	19.2	—
1927....	921	508	413	55.2	44.8	35.2	19.4	—
Deaths, all ages						(Per 1,000 population)		
1920....	396	215	181	54.3	45.7	17.8	9.7	—
1921....	306	164	142	53.6	46.4	13.4	7.2	—
1922....	315	193	122	61.3	38.7	13.5	8.3	—
1923....	284	141	143	49.6	50.4	11.9	5.9	—
1924....	338	169	169	50.0	50.0	13.8	6.9	—
1925....	294	147	147	50.0	50.0	11.7	5.9	—
1926....	332	174	158	52.4	47.6	13.0	6.8	—
1927....	348	186	162	53.4	46.6	13.3	7.1	—
Deaths under one year of age						(Per 1,000 live births)		
1920....	79	54	25	68.4	31.6	112.5	121.9	96.5
1921....	60	39	21	65.0	35.0	82.0	78.5	89.4
1922....	58	42	16	72.4	27.6	79.3	81.9	73.4
1923....	31	20	11	64.5	35.5	40.4	38.7	43.8
1924....	63	38	25	60.3	39.7	80.5	76.0	88.3
1925....	32	19	13	59.4	40.6	39.5	39.1	40.1
1926....	71	35	36	49.3	50.7	83.9	71.1	101.7
1927....	43	22	21	51.2	48.8	46.7	43.4	50.8

TABLE II

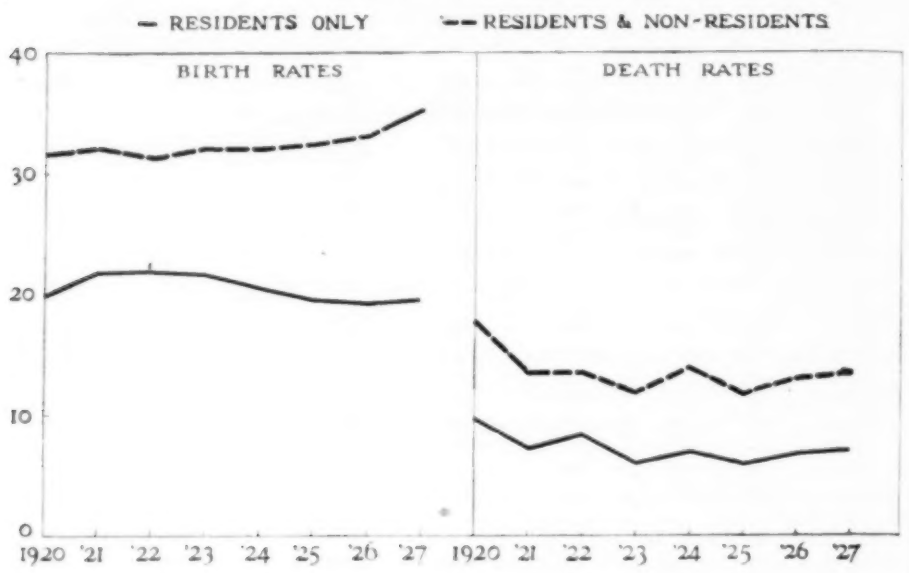
DEATH RATES BY CERTAIN SPECIFIC CAUSES WITH NON-RESIDENTS INCLUDED AND EXCLUDED FARGO, N. D., 1920–1927

Annual Average Rates per 100,000 Population

Causes of Death (International List Numbers)	Fargo		U. S. Registration Area, 1920–1926
	Total Including Non-residents	Residents Only	
Typhoid Fever (1)	6.4	1.9	7.6
Influenza (11)	52.8	26.8	35.8
Tuberculosis (31–37)	56.5	35.3	96.5
Cancer (43–49)	124.3	68.0	88.8
Diabetes (57)	30.7	16.0	17.3
Cerebral hemorrhage and softening (74, 83)	67.4	46.0	86.2
Diseases of the heart (87–90)	134.8	86.4	172.6
Pneumonia (100, 101)	107.4	66.5	105.0
Appendicitis and typhlitis (117)	60.0	7.8	14.5
Hernia and intestinal obstruction (118)	30.1	7.0	10.7
Nephritis (128, 129)	55.3	29.9	90.7
Puerperal causes (143–150)	27.9	8.4	16.2
Congenital malformations and diseases of early infancy (159–163)	135.8	79.2	78.9
Violent deaths, suicide excepted (175–203)	69.0	32.2	82.0

FIGURE I

BIRTH RATES AND DEATH RATES INCLUDING AND EXCLUDING NON-RESIDENTS, FARGO, N. D., 1920–1927



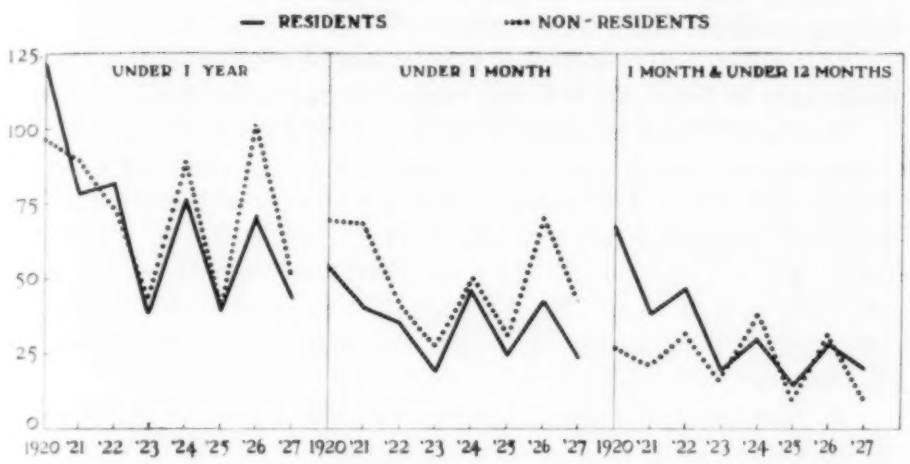
of residents occur outside. This is confirmed for deaths by the resident rates prepared by the U. S. Bureau of the Census following allocation to Fargo of deaths of residents occurring elsewhere in the U. S. Registration Area. In 1924 and 1925 these resident rates were 7.8 and 7.6 respectively—only slightly higher than the rates based on resident deaths used in this study and far below the rates including local deaths of both residents and non-residents.

Infant mortality rates calculated with reference to resident births and deaths and non-resident births and deaths also showed important differences (Figure II). Among non-residents, the total infant mortality rate tended to be higher than the resident rate, especially in the years 1924 and 1926 when both rates were considerably above those for other years in the demonstration period. For infants under 1 month, the non-resident rate was consistently high, as would be expected with the large number of non-resident births and deaths in hospitals, many of which were probably cases with threatened complications brought in from the surrounding area. For the older infants, there is less consistent difference between the non-resident rates and the resident rates.

Mortality rates for certain causes requiring operative or other special care are shown in Table II, and are especially high when non-

FIGURE II

RESIDENT AND NON-RESIDENT INFANT MORTALITY RATES, FARGO, N. D., 1920–1927



residents are included. These rates including non-residents are in most instances high in comparison with rates for the U. S. Registration Area, while resident rates are about the same or somewhat below. Other rates by cause varied less if non-residents were or were not included.

Among non-resident deaths, about 59 per cent were male and 41 per cent female. Among residents there was a smaller proportion of male deaths—55 per cent in comparison with 45 per cent for females. The proportion of male deaths among non-residents was especially high in the group of deaths due to accidental cause.

As shown in Table III, there was a larger proportion of non-resident deaths in the age groups over 5 years and under 55, while the

TABLE III

RESIDENT AND NON-RESIDENT DEATHS BY AGE, FARGO, N. D., 1923–1927

Age	Number of Deaths			Per Cent	
	Total	Resident	Non-resident	Resident	Non-resident
Total	1596	817	779	51.2	48.8
Under 1	240	134	106	55.8	44.2
1–4	87	45	42	51.7	48.3
5–9	44	20	24	45.5	54.5
10–14	32	11	21	34.4	65.6
15–19	36	10	26	27.8	72.2
20–24	51	18	33	35.3	64.7
25–34	134	57	77	42.5	57.5
35–44	132	56	76	42.4	57.6
45–54	189	77	112	40.7	59.3
55–64	211	111	100	52.6	47.4
65–74	252	139	113	55.2	44.8
75 and over	188	139	49	73.9	26.1

proportion of resident deaths was larger in the younger and older age groups.

Among non-residents 26 per cent of the births were illegitimate; among residents about 2 per cent.

It is obvious therefore that tabulations of vital statistics for residents only in Fargo are a better means of measuring health progress.

Another difficult problem in the use of vital statistics for measurement purposes was created by the small number of resident births and deaths each year. For instance, with the number of births and infant deaths in 1926 there was a standard error of 11.58 for the infant mortality rate of 71.1, and in 1927 a standard error of 9.03 for the infant mortality rate of 43.4. Fluctuations in most yearly rates have therefore limited significance in comparison with similar fluctuations in communities with larger populations.

As illustrated in Figure II, there was also a marked tendency for the infant mortality rate to vary within the demonstration period considerably in excess of the expected amount of yearly variation which might be attributed to the small number of cases. In 1924 and 1926 both the resident and the non-resident rates were nearly twice as high as in 1923, 1925 and 1927. These same differences were also present for both residents and non-residents in the mortality rates for infants under and over 1 month.

In a search for possible causes for these wide fluctuations in annual rates, all infant deaths of residents were allocated to the year when the child was born, and yearly rates were calculated on this basis. While this method reduced somewhat the amount of fluctuation, the resident rates for 1924 and 1926 still remained high in comparison with those for other years in the demonstration period.

Detailed study of causes of death during these years showed that in the 2 years with high rates the mortality from congenital causes* and from respiratory diseases among both residents and non-residents was high. In 1924 there were also more deaths from diarrhea and enteritis than in the other years. In 1926, the other high year, there were more deaths due to accidents and other external causes.

In 1923, the first year with a low rate, there were few deaths from premature birth and no corresponding increase in stillbirths from this cause. In 1925 and 1927 the low rates were apparently caused by a fairly evenly distributed reduction in the various causes of infant deaths.

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* It is interesting to note that in the year 1926 there were 13 infant deaths from comparatively rare abnormalities such as hydrocephalus, spina bifida, anencephalus, foramen ovale, etc., while in other demonstration years there were never more than 4 deaths per year from these causes.

Apparently the wide fluctuations in infant mortality rates during recent years are due to the concentration of various unrelated favorable and unfavorable factors within particular years. If these had shifted but slightly, as, for instance, if the mortality from congenital causes had not happened to be high in a year when the mortality from respiratory causes or from accidents was also high, much of the present variation in rates based on a small number of total deaths would have been eliminated.

Under such conditions neither the high nor the low rates during successive years of wide fluctuation are accurate for use in measuring changes in local health conditions or in making comparisons between local rates and those for other areas with larger units of population. Therefore, the policy finally formulated for the measurement studies was to combine vital statistics for the 5 demonstration years in an effort to eliminate accidental fluctuations in yearly rates. The same policy has also been followed in the combination of data for the 3 pre-demonstration years, the maximum period, as previously described, for which comparable data could be secured.

MEASUREMENT FINDINGS

In certain instances mortality rates as calculated in these measurement studies gave little or no definite indication of health improvement within the demonstration period. Usually these rates were based on a very small number of cases; they were related to conditions which, as experience elsewhere shows, are likely to respond slowly to preventive health measures; or the rates during pre-demonstration years were already low in comparison with those for the registration area. For example, the stillbirth rates in Fargo were 3.7 for the years 1920–1922 and 3.5 for the years 1923–1927, in comparison with corresponding rates of 4.0 and 3.9 for the registration area. The maternal mortality rate (which was based on a total of only 5 maternal deaths in 1920–1922 and 12 maternal deaths in 1923–1927) increased from 3.5 in the early years to 4.8 in the demonstration years but remained considerably below the registration area rates of 7.1 and 6.6 for these periods respectively. Tuberculosis rates were also low—33.8 and 38.6 for resident deaths in the years preceding and during the demonstration period respectively. Careful checking showed that these rates would have been increased but slightly by including the relatively few residents who died outside of the city from tuberculosis.

In other instances, however, mortality rates for Fargo residents during the demonstration years indicated fairly definitely an improvement in the status of community health.

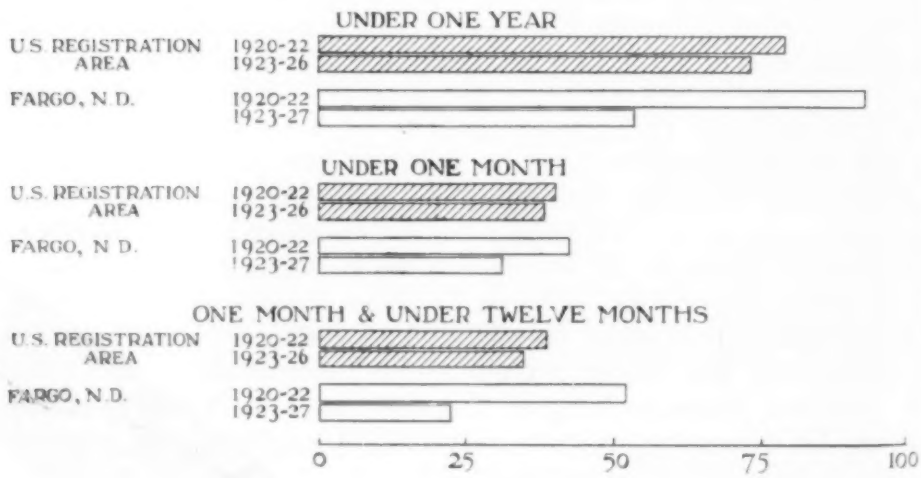
The average infant mortality rate for the years 1923–1927 was 53.5 in comparison with an average rate of 92.9 during the pre-demonstration period—a reduction of about 42 per cent. Among infants over 1 month of age the average mortality rate was reduced from 50.2 to 22.4, or by 55 per cent; for infants under 1 month of age from 42.7 to 31.3, or by 27 per cent. All these later rates for Fargo are considerably below those for the U. S. Registration Area while pre-demonstration rates were relatively high (Figure III).

Study of reduction in infant mortality rates by cause showed, as would be expected, that the reduction has been greatest in the group of causes at present especially subject to known measures of prevention and control. For instance, no infant deaths occurred among Fargo residents within the demonstration period from measles, scarlet fever, whooping cough or diphtheria, although in 1920–1922 the infant mortality rate from these causes was high in comparison with the registration area. In comparison with the pre-demonstration years the infant mortality rate from diarrhea and enteritis for the demonstration years was reduced by two-thirds; from influenza, bronchitis and pneumonia by over one-half; from congenital causes by about one-fourth. All of these reductions were considerably greater than reductions in corresponding years for the registration area.

Mortality rates for preschool children and school children have also been markedly reduced, although the small number of such deaths (see Table III) makes these changes of less significance than those in infant

FIGURE III

AVERAGE INFANT MORTALITY RATES IN FARGO, N. D., IN COMPARISON WITH U. S. REGISTRATION AREA



mortality. For children in the age group 1–4 years, the mortality during demonstration years was 430.4 per 100,000 population in comparison with 683.1 for the pre-demonstration period. For the age group 5–9 years, the demonstration rate was 172.3 in comparison with 252.3 for the pre-demonstration period; for the age group 10–14 years, the demonstration rate was 113.0 in comparison with 207.0. Here also the recent reduction was most marked with reference to epidemic, endemic and infectious diseases, diarrhea and enteritis and diseases of the respiratory system.

As pointed out by Dr. Walker in his appraisal of public health work in Fargo,* the deaths of persons under 20 years of age from certain preventable causes (typhoid fever, diphtheria, scarlet fever, measles, whooping cough, tuberculosis, diarrhea and enteritis, bronchitis and pneumonia) have shown a decrease from an annual average of 33.0 deaths in the period 1920–1922 to an average of 14.8 deaths in the period 1923–1927.

While only a relatively small number of cases are concerned in these comparisons the large difference in most of the rates between the demonstration and pre-demonstration years, the similarity in the downward trend in rates for children in different age groups and the close agreement between the reductions indicated and those occurring elsewhere where preventive health services have been organized, indicate measurable health progress during the demonstration period.

* See Part II, Fargo Final Report, p. 6.

Welfare Work for Young Workers in Austria

AUSTRIA recently celebrated the tenth anniversary of the establishment of the government welfare bureau for young workers. This bureau was organized at a time when the adverse economic conditions of the war period were beginning to affect seriously the health of the majority of the young workers. The main function of the bureau is to provide at a nominal charge vacations in the country for young workers whose health is below par. Homes for this purpose are conducted by the bureau. These homes provide proper food, outdoor exercise, and recreation under the supervision of physicians. The average stay in these homes is four weeks.

The cost of the work is met by contributions from the sickness-insurance funds, appropriations of the national and local governments, and fees paid by the young workers who take advantage of the homes.

During the 10 years of the bureau's existence, over 75,000 young workers have been cared for in the 6 rest homes.—*Lehrlingsschutz, Juggend- und Berufsfürsorge,* Sept., 1928, p. 3.

What We Do Not Know about Accidents*

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ACCIDENTAL deaths will be considered in this paper, disregarding non-fatal injuries, about which our ignorance is even greater than about fatalities. I shall discuss three things that we do not know about accidental deaths: first, how many there are; second, where they occur; and third, their circumstances.

HOW MANY ACCIDENTS

It is quite true that at present we do not know how many people are killed by accident in the United States each year. There are two reasons for this: first, incomplete reporting within the U. S. Registration Area, and second, lack of reports from outside this area. The first is less important than the second, and the second is receiving more and more attention. One evidence of this attention is the slogan printed in red on the stationery of the U. S. Bureau of the Census: "Every State in the Registration Area Before 1930." I feel sure that the conditions which have prevented the remaining few states from entering the registration area will be eliminated within the next two years so that this goal can be reached. When it is reached and we can include 100 per cent of the population of the United States in the registration area, then we shall know more accurately than we do today the number of deaths from accidents, as well as other causes, in the entire United States.

WHERE ACCIDENTS OCCUR

Neither do we know where accidents occur. Two methods of classifying accidental deaths suggest themselves: first, a classification by type, such as falls, burns, machine accidents, etc.; the other a classification by the place of accident occurrence. In general, the *International List of Causes of Death* follows the first method. With one or two exceptions the International List numbers from 175 to 196 and from 201 to 203 separate different types of accidental injury. An exception to this method is classification 186 A, traumatism in mines;

* Read before the Vital Statistics Section of the American Public Health Association at the Fifty-seventh Annual Meeting, at Chicago, Ill., October 16, 1928.

another is 186 B, traumatism in quarries. In these two instances the second method of classification has been followed, namely, a classification by the place of accident occurrence. In other words, an accident in a mine may be a burn, a fall, a machine accident, or other kind. All of these, however, would be classified in 186 A—mine accidents.

This classification by type of injury is quite essential. It supplies information of great practical importance. Its sufficiency as a method, however, must be considered in the light of the fact that statistics covering accidental deaths are not collected for the purpose of discovering what occurred in the past, but for determining what should be done in the future. The most important task of the accident preventionalist is the education of individuals that they may act safely.

There are several spheres of activity into which the life of the ordinary individual divides itself. These are, briefly, home, industrial, and public. There is undeniably a certain similarity among the various things done by an individual in any one of these spheres of activity, guided to a considerable extent by daily habits.

Paralleling this division of activity it is also true that accidents occur where men live, where they work, and in public places. Accident prevention should accordingly be undertaken with this in mind. Two accidents of the same type may be subject to entirely different preventive methods because one of them occurs in a public place while the other occurs in a home. Similarly, two accidents essentially different in type may become similar from the prevention standpoint because they both occur in a home under domestic conditions.

There is a fourth classification of accidents that is frequently made; namely, the separation of motor vehicle public accidents from those public accidents not involving a motor vehicle.

At the present time, information about accidental deaths, classified as suggested here, is not available. To be specific, some 17,000 persons died in the United States in 1927 as a result of falls. Some of these were falls of construction laborers from buildings, others were of men in factories, still others were of persons on floors and rugs in homes. We do not know the number in each of these groups; and this despite the fact that a reasonably exact distribution of all such accidents into the classes mentioned would be of the greatest value in prevention work.

Not knowing how many persons are killed each year in industries, in homes, and in public places, all we can do at present is to estimate them on the basis of meager information. And if more than one agency attempts to make such an estimate there is liable to be a wide divergence of results. Let me repeat that this information is vitally

important. It would make possible, excluding automobile accidents, a separation of each accident classification in the *International List of Causes of Death* into the three groups of public, home, and industrial accidents.

It would of course be insufficient to have such a separation only for the country as a whole. The differences from one part of the country to another are great and significant. Perhaps the outstanding one is the difference between rural and urban sections. We should want, therefore, a complete separation of the rural and the urban experience, covering type of accident as well as place of accident. At the present time we know much less about rural accidents than about urban accidents, because difficulty has been experienced in the past in obtaining detailed accident information except in cities. It is quite certain, however, that this grouping of accidents by place of occurrence would be quite different in country from in city.

We also need to obtain detailed information covering the age and sex of accident victims in each of these three classifications. These things would be of immense value to the safety worker because accident prevention efforts, to be successful, must be directed at specific hazards in specific locations. By the grouping of accidents in the way suggested, the prevention efforts can be correlated with the natural phases of human activity, with much better results than are otherwise possible.

CIRCUMSTANCES OF ACCIDENTS

The vehicular accident reporting card prepared and issued by the National Safety Council is now widely used. I mention this card because it illustrates the idea of obtaining detailed information on circumstances of accidents. In this case the circumstances relate to motor vehicle accidents only. Answers are required to such questions as: "What was the driver doing at the time of the accident?" and under this question such possibilities are suggested as turning right, turning left, passing standing street car, etc., all designed to throw new light on the circumstances surrounding the accident. Another question is: "What was the pedestrian doing?" Still others ask about the road condition, the light condition, and so on. If the conditions and circumstances revealed in such reports are actually used to educate motor vehicle drivers and pedestrians to avoid taking those actions which result in accidents, then we have taken a step toward the solution of the problem.

Information of this kind is needed regarding all types of accidents. Some of it is now available in connection with industrial accidents. In

a few states some of it may be had relative to motor vehicle accidents. But in both of these cases the information is far from satisfactory as representing nation-wide conditions. For public accidents not involving a motor vehicle, and for home accidents, we have almost no such information.

We need to know not only how many falls occurred in homes, but also how these falls occurred; how many of them were falls on stairs and steps; how many resulted from tripping on rugs; how many from falling off porches and from trees, etc. In the classification of home fires we need to know whether the fire was started by a match, by spontaneous combustion, by poor electrical wiring or by something else. Something can be done toward the prevention of falls by simply pointing out to persons that so many occur in homes; but much more can be done if the circumstances under which those falls occur can be accurately set forth.

The same thing is true of public accidents. We need to know how many accidents occur in falls in public buildings, how many result from flying objects of one kind or another, how many from elevator accidents, etc.

From what sources of information may we expect to obtain these facts? Several possibilities suggest themselves: A state industrial commission may be expected to obtain reports of all accidental deaths falling within the scope of the Workmen's Compensation Law. The usefulness of this information is limited to a considerable extent by lack of uniformity in Workmen's Compensation Laws and lack of uniformity between the various states in statistical procedure.

A state motor vehicle department, with a properly prepared law requiring reports of motor vehicle accidents, may obtain rather complete information on motor vehicle deaths. In some 8 or 10 states this is being done in quite a satisfactory fashion.

The insurance companies are in a position to obtain complete and accurate information on such deaths as occur to their policy holders. The limitation here is the obvious one that not all persons in the country are insured.

A review of these and other sources shows them to be inadequate for our purpose. If a complete record of accidental deaths in any state, community or nation is wanted, we must turn to the officials who receive, by law, reports on all accidental deaths.

To do this job in a complete fashion will require a certain amount of additional procedure on the part of registrars of vital statistics. This is because the death certificate, as at present constituted, will not reveal the information which is outlined as desirable for accident pre-

vention purposes. While this certificate does make possible complete reporting on deaths by disease, the detailed reporting of accidents must be accomplished by some new means.

What has been done in this direction? I shall attempt to tell you very briefly. About one year ago, A. A. Whittemore, M.D., State Health Officer of North Dakota, and an officer of the North Dakota State Safety Council, wrote to me pointing out how meager was the available information on accidents for use by the North Dakota Safety Council in its prevention work in that state. At that time he asked the coöperation of the National Safety Council in proposing some method whereby he, as head of the State Health Department and Registrar of Vital Statistics, could obtain complete and detailed information on at least fatal accidents in his state.

After an exchange of correspondence a proposal for a supplementary accident reporting form was made through my office. Dr. Whittemore, with characteristic energy, printed a quantity of these forms and immediately put them to use in North Dakota, requiring in every case of accidental death a report on this form in addition to the usual death certificate. Shortly after that time, as the news of this pioneering job spread to other states, James E. Bauman, Assistant Director of the Ohio State Health Department, wrote of his interest in doing this same thing for the State of Ohio. The proposed reporting form was brought up to date and was given a trial of several months in that state. Very recently the proposition has also been taken up in the State of Arkansas.

This suggested reporting form is far from perfect. Changes in it will undoubtedly be necessary as a result of experience. It is true, however, that the form is not a radical departure from similar work that is being done. The information requested on motor vehicle accidents, for instance, corresponds exactly with the work being done in the traffic accident field by some 60 cities and 8 or 9 states with compulsory accident reporting laws. The section pertaining to industrial accidents is the same as that recommended by the U. S. Bureau of Labor Statistics. In all other respects the reporting form was designed so that the information obtained would be comparable with any that is being obtained in other ways. A punch card for use in mechanical tabulation has also been developed; and forms are available which facilitate an analysis of the information.

It is my hope that this plan will be tried out by many more states. I am sure that as its use spreads, resulting in much new data, we will see reductions in accidents.

DISCUSSION

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THE first purpose of classifying deaths from accidents is the separation of these and of other violent deaths from the deaths which are due to natural causes. The classification of accidental deaths according to the nature of the injury does not in general seem to be of first rate importance. It is of interest to know how many die from fracture of the skull, how many from the piercing of internal organs, how many from broken ribs, etc.; but this classification would take on its main usefulness in connection with a knowledge of the total number of cases, so that a case rate could be reached. Standing alone it does not seem to merit an adoption as the general principle of subdivision. The main object in a classification of accidents is their prevention, and it may be that by not going far in the subdivision of this class, the International List limits its own usefulness.

It has also to be noted, as Mr. Forney states, that the classification is not on a uniform basis. In addition to accidents in mines and quarries, where the type of locality instead of the type of accident is the criterion of classification, there are also such rubrics as "accidental mechanical suffocation," and "accidental drowning," which describe rather the manner than the circumstances of a death. This also applies to "accidental burns and scalds," except that in this case the caution is inserted (except those resulting from conflagration, the latter, number 178, being classified on a different basis). The death is attributed to conflagration whether it is by burning, suffocation, a fall, or by being trampled upon in trying to get out of a building.

To take, for example, drowning, it seems fairly clear that to point a lesson for prevention, further details are required. It should be ascertained whether the victims were swimming at the time of the accident, were in pleasure boats or in larger vessels, or whether these accidents were industrial in their nature, that is, whether those involved were fishermen, sailors, etc. We do not tabulate this kind of information and do not as a rule even possess it. Of 298 cases of deaths from accidental drowning in the Province of Ontario in 1926, 14 were given as industrial in their nature—sailors, fishermen, river drivers and lock masters; 9 were drowned while swimming and 9 in some other stated manner. In no fewer than 253 cases the record failed to give any details beyond the statement that the decedent was drowned.

Mr. Forney's suggested division of accidents into three classes—in industry, at home and in public places, appears to have a great deal of significance. Presumably prevention of accidents in industrial life will be largely attained by inspection of premises and regulation of safety appliances; prevention in public places may be largely a matter of regulation regarding traffic, overhanging signs, etc.; but it may also depend on care exercised by public servants as in the matter of clearing slippery streets, maintaining adequate protection against the danger of falling into excavations, taking proper precautions in the matter of demolition of buildings, etc., etc. On the other hand, the prevention of accidents in the home environment will depend almost wholly upon individual precautions, and the work of the preventionalist must here be confined in the main to education.

If, however, accidental deaths are to be published under these three headings

an exact definition of the field embraced under each will be required. Industrial accidents do not perhaps offer great difficulty in this respect, although there is certainly a difference between work which is well organized and conducted by a body of men under the leadership of an employer or foreman and that which is carried out by an individual on his own behalf. In the latter case, again, prevention will be mainly a matter of individual precaution. As between home and public accidents there appears to be a borderland in which it would be difficult to say under which heading accidents should be classified.

For example, is it to be assumed that all drownings except the industrial occur in public places (except in the very few cases which occur on the home premises), or is the distinction to be drawn between places such as beaches which are under public regulation and protection and those drownings which occur in more private surroundings such as in unsupervised water?

Some cases are rather embarrassing—for instance, should the passengers who are drowned in a shipwreck be classified as having died of drowning or as having died of accidents of transportation? In the matter of elevator accidents, are all of these to be considered as occurring in public places or would an elevator in a rooming house or apartment house be considered as belonging to the home environment. Falls might offer many cases in which it would be hard to decide to which rubric the death appertains, and on the whole it seems that a good deal of definition would be required before accidents could be tabulated under these headings with any probability of fair comparison between the statistics published by different bodies.

It is apparent that the mere division into environments will not accomplish everything from the preventive standpoint. To see what kind of material we had on hand in our office at Ottawa, deaths from certain forms of accidents for the Province of Ontario for the year 1926 were reviewed. Reference has already been made to the deaths from drowning, but it may be interesting to note what the returns on hand show for several other kinds of accidents.

Of 259 deaths due to falls 74 were shown to have taken place in the home environment. The preventionalist who would wish to effect improvement by means of cautionary literature would, however, need to know more than this. Of these falls, 41 were on steps or stairs, 7 from window, balcony, etc., 11 were falls on a floor and 2 off tables, chairs, ladders, etc. The number of falls, industrial in their nature, amounted to 156; falls in public places numbered 19, of which 10 were falls on pavement, street or ice, 1 was from a height while 8 were of some other nature. In no fewer than 110 cases the information was limited to the fact of a "fall," and the accident could not be further classified.

Deaths from accidental traumatism by machines numbered 46. Of these 5 were due to an elevator accident and 3 were industrial. Corn cutters accounted for 3 deaths, circular saws for 5 and threshing machines for 3; in 30 cases there was no detailed information. It may be presumed that in nearly all cases where an elevator is not involved these accidents from machines are industrial.

Deaths classified under 181, accidental absorption of irrespirable or poisonous gas, numbered 28, of which 16 were credited to carbon monoxide. In 4 of the 16 cases the accident was attributed to automobiles, but in the remaining 12 further information was not available; of the remainder, 4 deaths were charged to coal gas and 7 to illuminating gas. The important feature here seems rather the circumstance than the chemical nature of the gas.

Poisoning by food was given as the cause of 20 deaths. In 12 cases ptomain

poisoning was the cause; in 5 cases deaths were attributed to toadstools and poisonous mushrooms. The number of cases is small but the example is cited as one in which from the standpoint of prevention it is necessary to know the kind of food article responsible for the damage.

Under the Canadian system of classification, deaths in which an automobile figured are classified as automobile accidents whether in the case of a pedestrian struck by an automobile or the collision between an automobile and a train or other vehicle. The total number of deaths coming under the classification of automobile accidents in Ontario for the year 1926 was 242. An examination of these certificates revealed the fact that in 82 cases pedestrians had been killed by automobiles, in 15 cases deaths were due to collision between automobiles and trains, in 6 cases between automobiles and street cars, in 9 cases between two automobiles, and in 3 cases between an automobile and some other vehicle. In 15 cases there was no external contributory vehicle, while in 107 cases the details of the accidents were not given. Motorcycles when stated as the cause have been excluded from the above analysis. It is evident that for a more detailed classification of automobile accidents than is now available in Canada we would have to demand such classification on the certificate (a rather difficult matter, when the form of the certificate envisages deaths from natural causes as well as by violence), or to refer the question back to the local registrar in the manner suggested by Mr. Forney, or to obtain this additional detail from coroners' reports, police reports or other sources.

Mr. Forney points out the necessity of classifying returns of fatal accidents into rural and urban, arguing with considerable truth that conditions surrounding these accidents are likely to be very dissimilar. A difficulty arises here, however, in deciding at what point the distinction will be made, whether by the census definition of rural and urban, or whether the minimum for the higher category should be, say cities and towns of 5,000, 10,000, 25,000 or even 100,000 population. We are embarrassed here between the desirability of making all significant distinctions and the impracticability of carrying the division too far.

Another difficulty arises in this matter. For the movement of population in general, the significant locality is no doubt the locality of residence, and it is customary to tabulate deaths in vital statistics either by the place of residence or by the place where the death occurred. From the standpoint of preventive measures, however, the significant locality for deaths from accident is not necessarily either of these but the place where the accident occurred. Quite recently the Dominion Bureau of Statistics had a communication from the chief constable of one of the Canadian cities taking exception to a tabulation of automobile accidents on the grounds that the figures published for his city included a number of cases in which the accident had occurred beyond the city limits but where the victim had been hurriedly rushed to a city hospital in an attempt to save life. The bulletin giving the figures complained of contained a caution on this very subject but the difficulty remains. It may be argued that this is properly a matter for police statistics, and not for vital statistics; nevertheless, if accidents are tabulated with a view to present the information in the best form for preventive purposes, the locality of occurrence takes on especial interest.

Mr. Forney has referred to the classification of industrial accidents and the possibility of obtaining reports on deaths of this nature when they fall within the scope of workmen's compensation laws. In Canada the Federal Labour Department pursues a more ambitious policy and endeavors to collect particulars of fatal (as well as of non-fatal) industrial accidents.

The Labour Department gathers its information from a variety of sources, including press clippings, and attempts even to cover the field of agricultural accidents. It must be admitted, however, that statistics compiled from such heterogeneous sources can be made complete only at the cost of exhaustive labor, and it seems unfortunate that with records presumably covering all except a negligible number of the accidental deaths in the country these records cannot be made available for the purposes of compiling industrial accidents.

If a scheme such as Mr. Forney suggests is followed, difficulties will no doubt arise as to the degree of detail in which statistics of accidental deaths can be collected and published. The form suggested by him is very detailed with regard to vehicular accidents, and at the present day it is very proper that a great deal of attention should be centered on this type of accident. In so far as other accidents are concerned, however, it might be suggested that necessary details are neglected. There is no inquiry designed to show under what circumstance an accident may have occurred; in public accidents the rubric, "buildings and structures," appears somewhat inadequate; street accidents "non vehicular" also appears a somewhat indefinite type; and in home accidents no distinction is made between the kinds of falls.

These things are mentioned, not as criticism, but to illustrate the difficulties which will arise if the vital statistician goes beyond the International List in determining at what point practical considerations must put a stop to further subdivision of classes of accidents.

After the registration of the cause of death in the usual manner it appears probable in accordance with Mr. Forney's suggestion that this second form (one referred to as being used in North Dakota and Ohio to obtain supplementary information) also should be completed by the local registrar as he is in the best position to know whether the information can be obtained from a police report or a coroner's report, or whether he must go to other sources. It will, however, be apparent that this is thrusting additional work on a class of men whose duties as registrars are usually incidental to the tenure of an office of a municipal nature. Whether these additional duties will be welcomed with such zeal as to promise their conscientious performance is a question which may well arise. This is of course a matter not for the federal but for state and provincial offices both in United States and in Canada.

Consultation Center for School Children Suffering from Heart Disease in Berlin, Germany

A MUNICIPAL consultation center for school children with heart disease was recently established in Berlin. At this center, school children are examined before they are allowed to engage in long hikes, swimming or other sports, or gymnastics, and also before they select an occupation.—*Zeitschr. f. Kinderschutz, Familien- und Berufsfürsorge,* Vienna, Sept., 1928, p. 146.

Symposium on Schoolroom Ventilation*

Reports on Schoolroom Ventilation Studies

NEW HAVEN, CONN.

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THE frequency of the common cold among adults throughout this country is so high that one hardly requires a statistical treatment of this subject to become aware of the importance of this problem. Recent studies of the U. S. Public Health Service[1] show that respiratory diseases account for 47 per cent of all the cases of illness reported in a large industrial group during a 5-year period. Among school children the problem is one of greater magnitude, for the child is more susceptible to respiratory diseases than is the adult.

Evidence has been slowly accumulating, which serves to show that the method of ventilating the schoolroom has an important bearing on the health of the school child as measured in terms of respiratory disease rates.

In the first study of this subject made by the New York State Commission on Ventilation the findings appeared to us to be of considerable importance. For this reason the study to be described was inaugurated in the fall of the year 1926.

The present study was conducted in 7 schools of New Haven, Conn., by permission of the superintendent of schools and with the assistance of members of his staff to whom we are indebted.

The desideratum was of course to select schools of both types (mechanically and naturally ventilated), situated geographically as closely as possible together in order to study pupils from homes having the same social and economic backgrounds. In addition, it was essential to obtain the best examples of the types of ventilation under study that the city had to offer. The final selection of the 7 schools, 4 mechanically ventilated and 3 window ventilated, represents the most satisfactory choice from these points of view.

The 4 mechanically ventilated schools are between 14 and 26 years old, the average being 19 years. These schools are all two stories in height, made of brick with cement and wood floors and ventilated by a

* Presented before the Public Health Engineering Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 15, 1928.

fan located in the warm air chamber. In a few cases accessory direct radiation is provided. The warm air enters the classroom by means of a duct, usually approximately 25 x 30 inches, located near the ceiling, and leaves the room by a 25 x 30 inch register located at the floor level. In the case of one of the mechanically ventilated schools (Worthington-Hooker), heating and ventilation is accomplished by the univent system.

The 3 window ventilated schools are all older than the mechanically ventilated ones. They average 54 years of age, varying from 39 to 65 years. Heating is in each case accomplished by direct radiation in general placed on the outside walls of the rooms but not in accord with the very best practice with respect to the location of windows. The windows are generally provided with slanting window boards. The gravity exhausts from the schoolrooms vary from 12 x 18, to 24 inches square. In most cases these are at the floor level and for this reason do not adequately meet the requirements of this type of system.

ORGANIZATION AND CONDUCT OF STUDY

In all, 3,596 pupils were under observation in this study, 2,052 in the 4 mechanically ventilated schools and 1,546 in the 3 window ventilated buildings. The study was begun in December, 1927, but because of the extended vacation, we have only utilized data from January 3 to April 1, inclusive.

Absences were reported on a form devised for this purpose. All the teachers were required to submit the cause of absence for every child away for one-half day or longer. The teacher in this instance determined the cause of absence from the child, from the parents, and in some cases by notification from the family doctor. In addition to these data concerning all absences, we have been able to obtain a complete set of absolutely independently collected data concerning absences of a duration of three days and more. In this case the diagnosis was made by the doctor or health department nurse. These data were obtained through Dr. C. C. Wilson, a student in the Yale Medical School, who was then engaged in a study of school absences in all the schools of New Haven, Conn. The present study, therefore, makes use of two independently collected sets of data, one of all absences and one of absences of three or more days' duration. Throughout this study we have considered respiratory illnesses to consist of colds, sore throat and other affections of the respiratory tract, such as pneumonia, bronchitis, etc.

By means of a suitable mimeographed record, we collected data from the schools, showing the number of children who while in at-

tendance appeared to be suffering from respiratory disease. The value of these data is in our opinion highly questionable, and for this reason we are not reporting them at this time. Information concerning the temperature of schoolrooms was obtained by observation either by the teacher or one of the pupils of the dry bulb thermometer four times during the course of the school day. These temperatures were recorded on the mimeographed form provided for this purpose.

At the start of the study the teachers were impressed with the importance of learning the true cause of absence and of reporting the true temperature of the schoolroom. At no time were instructions or suggestions issued to the teacher or any other of the operating officials concerning the management of ventilation systems or the proper temperature to be maintained in the schoolrooms. The test was devised as a study of actual operating conditions as found in the ordinary schools of an average American city.

THE RESULTS OF THE STUDY

As pointed out earlier, it is highly important that the two groups of schools be comparable with respect to age group and nationality. The first analysis of our material disclosed the fact that the mechanically ventilated schools had an average percentage of 29.9 pupils of American parentage as contrasted with 15 per cent in the window ventilated group. For this reason we examined our data and eliminated from the mechanically ventilated group the Worthington-Hooker School which possesses a very high population of American parentage (70.8). The elimination of this school with its univent system served also to make the ventilation of the mechanically ventilated group more nearly of uniform character and finally yielded a mechanically ventilated group of schools having an average of 17.5 per cent of pupils of American parentage as contrasted with 15 per cent in the naturally ventilated group. From this viewpoint, the two groups are highly comparable. The age factor is also of much importance and our two groups now possess pupils of highly comparable age, 7.9 in the mechanically ventilated group and 8.6 in the naturally ventilated group of schools.

Examination of these two groups of schools reveals the fact that the number of pupils in each group is approximately the same, 1,573 as compared with 1,546; the total number of pupil sessions is very nearly the same, 180,000 and 187,000; the mean weighted daily temperature is 67.6 in the mechanically ventilated group and 68.1 in the naturally ventilated group of schools. In all of these foregoing respects the two groups of schools are very nearly alike. The data for

absences, however, in these two groups of schools show striking differences. The mechanically ventilated group suffers a total absence rate (all causes) of 6 per cent of the total pupil sessions, whereas the naturally ventilated group has a rate of 3.9. All absences due to respiratory disease amount to 3.0 per cent in the mechanically ventilated group and 1.8 in the naturally ventilated group. For three-day and more absences due to respiratory illnesses, the rate in the mechanically ventilated schools is 3.3 per cent and in the naturally ventilated schools is 1.2 per cent.

The observed differences in these two groups of schools cannot be ascribed to differences in age distribution for, in the same grades (and hence about the same ages), the respiratory disease rate is higher in the mechanically ventilated schools than in the naturally ventilated ones, the actual figures being the following from the 1st grade to the 6th inclusive. For the mechanically ventilated schools 5.0, 3.8, 3.8, 2.8, 2.1, 2.3, 2.0; for the naturally ventilated schools 3.7, 2.0, 1.8, 1.6, 1.9, 0.9, 1.3. In each one of the corresponding grades, the rate in the naturally ventilated schools is lower than that in the mechanically ventilated ones.

In attempting to make certain that the origins of these absences have been truly established, we have analyzed the three-day absences into the following groups: all causes, respiratory illness, other illnesses and other causes. It was found from this analysis that the mechanically ventilated schools showed an excess of 5,000 pupil sessions absence due to all causes, approximately 4,000 of which were due to the excess of respiratory illnesses in the mechanically ventilated group over the naturally ventilated group; approximately 650 pupil sessions were ascribed to other illnesses, and but 350 pupil sessions to other causes. In other words, there was a very slight excess in absences in the mechanically ventilated group due to other causes (an amount equal to but two pupils absent during the course of the entire study), a somewhat greater amount of absences due to other illnesses, but still a comparatively small number, and a real excess of absences (approximately 4,000) due to respiratory illness.

Of the fallacy involved in the use of even weighted average temperatures, we are quite aware. Studies of the distribution of temperature in the schoolrooms failed to yield any information which would tend to indicate that there were significant differences existing between the rooms in this regard, and as pointed out earlier the average weighted temperatures failed to yield any significant differences. No investigations have been conducted of humidity or air motion in any of the schools under study. This remains for the future. It may well

be that the significant differences between the conditions maintained by the two systems of ventilation are linked up possibly with humidity and most likely with air motion.

REFERENCE

1. Sickness among industrial employees. *Pub. Health Rep.*, 41: 113 (Jan. 22), 1926.

CLEVELAND, O.

LYMAN W. CHILDS, M. D.

Supervisor of Health Service, Board of Education, Cleveland, O.

REALIZING that the incidence of respiratory affections among pupils and teachers presents a major problem, we decided to make a study in Cleveland of the effects of the two common types of ventilation—the forced draft system, and the open window type—upon the incidence of respiratory diseases and their sequelae among school children.

The plan previously used by the New York Commission on Ventilation in similar investigations offered a method of study. It was intended that the information secured should supplement the information this body had already accumulated in similar and previous investigations. In order to coöperate more fully with the Commission, their secretary, Thomas J. Duffield, was invited to meet with our committee. He subsequently rendered invaluable aid.

In practically all of the older school buildings in Cleveland, the ventilation is by open window. In the newer buildings situated in the outskirts of the city, the ventilation is by fan. Our first problem was the selection of the school buildings. There was no money available for the modification of the open window rooms. We, therefore, failed to comply with the recommendations of the Commission in the equipment of these rooms with gravity ducts and window deflectors. The buildings included in the study are as follows:

Harvard and Oliver Hazard Perry have split-steam systems with direct radiation and automatic regulation providing six changes of air per hour in accordance with the Ohio State Code, using 2 heat inlets into each room on the corridor side, 8 feet above the floor, 2 exhaust outlets at the floor line on the corridor side. No building has air washers or artificial humiditation. (Harvard has 11,970, and Oliver Hazard Perry 8,920 cubic feet per room, exclusive of cloakrooms.)

Sowinski will be interpreted as having window air supply, gravity vent flue and direct radiators under windows without automatic regu-

lation and without window deflectors in all windows. (Sowinski has a capacity of 11,770 cubic feet per room exclusive of cloakrooms.)

Broadway may be interpreted as having window air supply, but no vent flues with direct radiators under windows, without automatic regulation and without window deflectors. No changes were made in any buildings, nor in the composition of the population of these buildings, to bring the various elements of the experiment under more complete control. (Broadway has a capacity of 11,970 cubic feet per room, exclusive of cloakrooms.)

The schools were well matched for composition of population as to age and grade, social and economic status and national and racial origin.

The regular mental testing program of December, 1927, indicates that the schools which are mechanically ventilated have a somewhat less intelligent population than the schools which were naturally ventilated.

The committee in charge of the study discussed the factor of intelligence and decided to neglect it entirely as of no particular consequence. Since the results are favorable to the more intelligent group as well as to the naturally ventilated schools, it may be well to make note of the fact here.

The study was made in February and March, 1928, using the forms and following in the main "The Methods of Analysis" of Thomas J. Duffield.[1]

The method of determining the incidence of respiratory disease was made uniform throughout by the careful supervision of the Health Service Department of the Board of Education and the coöperation, under the direction of this department, of teachers, supervising nurses, and attendance officers. It was found convenient in the operation of this experiment to consider Sowinski open window building and Oliver Hazard Perry fan building as Group I; Broadway open window and Harvard fan building as Group II.

Two nurses devoted their entire time to instructing the teachers and investigating the cases present with respiratory diseases. The nurses in turn were instructed and supervised by the supervisor of health service. One nurse was assigned to Group I and one to Group II, alternating at the end of each week. Difficulty was experienced by both teachers and nurses in detecting slight colds. They were instructed to report or record no pupils present with a cold who did not have well marked symptoms, such as conjunctivitis, reddened throat, discharging nose, and voice symptoms, possibly coupled with coughing and sneezing. In other words, children with doubtful symptoms were

TABLE I

COMPOSITION OF POPULATION IN SCHOOLS

Nationality	O. H. Perry		Sowinski		Broadway		Harvard	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
U. S. White	259	33.5	246	25.9	246	30.1	310	30.7
Russian	17	2.2	41	4.3	24	3.0	12	1.2
Italian	86	11.1	18	1.8	25	3.1	22	2.1
Hungarian	14	1.8	4	0.4	5	0.6	1	0.1
Polish	8	1.0	352	36.9	377	46.3	555	54.9
Czecho-Slovakian			10	1.0	5	0.6	10	1.0
German	30	3.9	46	4.8	20	2.5	32	3.2
Austrian	120	15.5	26	2.7	35	4.3	16	1.6
U. S. Negro	1	0.1	11	1.1	15	1.8	1	0.1
English	25	3.2	12	1.2	9	1.1	6	0.6
Jugo-Slavian	177	22.9	13	1.3	7	0.9	1	0.1
Canadian	6	0.8	9	0.9	1	0.1	1	0.1
Lithuanian	8	1.0	108	11.2	6	0.8	1	0.1
Scandinavian	5	0.7	7	0.7	1	0.1		
Scotch	10	1.3	13	1.3	5	0.6	1	0.1
Irish	4	0.5	9	0.9	3	0.4	2	0.2
Roumanian					1	0.1		
All Others	4	0.5	28	2.9	29	3.6	40	4.0
TOTAL	774		953		814		1011	

TABLE II

	MECHANICALLY VENTILATED SCHOOLS			NATURALLY VENTILATED SCHOOLS		
	Harvard	O. H. Perry	Total	Sowinski	Broadway	Total
A. Total Pupil Sessions	35,984	24,408	60,392	33,365	38,660	72,025
B. Total Absences	2,252	1,283	3,535	1,633	2,071	3,704
Per Cent of Total Pupil Sessions	6.3	5.3	5.9	4.9	5.4	5.1
C. Pupils Absent with Respiratory Disease	777	515	1,292	787	651	1,438
Per Cent of Total Pupil Sessions	2.2	2.1	2.1	2.4	1.7	2.0
Per Cent of Total Absences	34.5	40.1	36.5	48.2	31.4	38.8
D. Total Pupils Present	33,732	23,125	56,857	31,732	36,589	68,321
Per Cent of Total Pupil Sessions	93.7	94.7	94.1	95.1	94.6	94.9
E. Pupils Present with Respiratory Disease	2,964	3,634	6,598	1,789	1,422	3,211
Per Cent of Total Pupil Sessions	8.2	14.9	10.9	5.4	3.7	4.5
Per Cent of Total Pupils Present	8.8	15.7	11.6	5.6	3.9	4.7
F. Pupils Present and Absent with Respiratory Disease	3,741	4,149	7,890	2,576	2,073	4,649
Per Cent of Total Pupil Sessions	10.4	17.0	13.1	7.7	5.4	6.5
G. Mean Temperature (F.°)	69.8°	70.5°	70.1°	69.3°	70.3°	69.8°

not asked to hold up their hands and acknowledge that they did or did not have colds, but regularly filed in front of the teacher, instructed by the nurse, who closely observed the cases.

Doubtful cases were reëxamined by the nurse. Teachers and nurses had one thought in mind, and that was to arrive at an analysis of the truth. Field visitors, middle-aged women from the attendance department, were given the same instructions as the nurses and, in accordance with these instructions, they daily determined and reported the cause of absences when they had visited the homes. They alternated their groups at the end of each two weeks so one visitor would not remain longer than that in one group of schools.

SUMMARY OF DATA

	Natural Ventilation Sowinski and Broadway	Fan Ventilation Harvard and O. H. Perry
1. Period of study	Feb. 6 to Mar. 23, 1928	Feb. 6 to Mar. 23, 1928
2. Pupil sessions, number	72,025	60,392
3. Pupils present and absent with respiratory diseases, expressed in sessions	4,649	7,890
4. Percentage	6.5	13.1

It will be seen that respiratory ailments among pupils present and absent were twice as frequent in the fan ventilated rooms as in the rooms with natural ventilation.

In comparing the two types of ventilation in reference to pupils absent with respiratory diseases, the difference found is insignificant. The same is true for total absences for all causes (see Table II). The 4 schools studied represented highly mixed race stocks, although they were well matched for composition of population (see Table I). In mixed race stocks, absenteeism is likely to be due to causes other than illness. Truancy particularly is likely to be greater.

In the Cleveland schools, a monthly bulletin of school attendance is issued by the superintendent's office. The school with the best daily attendance is first upon the list. Principals in their zeal for a good attendance discourage absenteeism on account of colds, unless they are of a serious nature. Moreover, the practice of absenting children from attendance in schools because of colds varies greatly in different localities. Some of the intelligent parents are in the habit of giving their children bed rest during the first day or two of an attack of acute coryza. Other parents pay no attention whatever to a cold and completely ignore its presence in sending their children to school. On the other hand, children present with a respiratory disease in school can be readily detected by teachers, nurses, and doctors.

The chief of the Bureau of Reference and Research of the Cleveland Public Schools in his statistical treatment of the collected data

endeavored to eliminate the element of chance in comparing the types of ventilation in their influence upon health. This chance element was seized upon by the conservative members of our committee as offering the possible explanation of the results of the experiment. In order to reduce to a minimum this accidental element, differences between schools and groups of schools in illogical combinations and arrangements were tabulated.

As an additional check, each building included in the Cleveland study was pitted against every other building regardless of the type of ventilation. The difference found between Harvard and Oliver Hazard Perry combined (mechanically ventilated) on the one hand, and Sowinski and Broadway combined (naturally ventilated) on the other, was more than twice the difference found between Sowinski and Oliver Hazard Perry combined, and Harvard and Broadway combined. No difference between schools or groups of schools compared accidentally or illogically was so great as the smallest difference between schools logically compared.

In all probability, then, the differences found are not due to mere chance, but represent real differences, reasonably certain to be due to differences in the ventilation of the buildings.

It has been stated that, for the purposes of our experiment, the only rooms available as open window rooms were in schools of an old type. The cubic capacity of these rooms is somewhat greater than that of rooms in modern school buildings. Thus, Broadway's rooms had 11,970 cubic feet capacity each, exclusive of cloakrooms; Sowinski, 11,770; Harvard, 10,690; Oliver Hazard Perry, 8,920. Broadway furnished 298 cubic feet per pupil; Sowinski, 294; Harvard, 267; Oliver Hazard Perry, 223.

The incidence of colds in these rooms proved to be in an inverse ratio to the number of cubic feet per pupil; thus, Oliver Hazard Perry, furnishing the smallest number of cubic feet per pupil, showed 17 per cent of colds; Harvard with 267 cubic feet showed 10.4 per cent; Sowinski with 294 showed 7.7 per cent; Broadway with 299 showed only 5.4 per cent.

The rooms with the greatest air capacity per pupil made the most favorable showing. On the other hand, there was a distinct correlation between the amount of air change and the number of colds. The most modern fan building, Oliver Hazard Perry, with the greatest air changes (6 changes per hour), showed the greatest incidence of respiratory diseases. Harvard, with a less modern ventilation equipment and presumably with an air change of somewhat less than 6 per hour, was next in order of respiratory diseases. Sowinski, a school with in-

sufficient air ducts near the floor, and with considerably less air change, was next in order, while Broadway, with no exhaust ducts, and but a feeble air change, showed the fewest number of colds.

Dry bulb thermometers were used in all schoolrooms under observation. The temperature was taken by monitors (pupils appointed by the teacher for this purpose), whose duty it was to read at intervals the thermometer suspended from the ceiling in the center of each schoolroom to a point just above the heads of the children. These monitors read the temperature at stated intervals and recorded it. When a room in the open window classrooms was found to be overheated, the monitors threw open the windows until the temperature had dropped to normal or below. In the fan ventilated buildings, the custodian was notified concerning an overheated room. In the mechanically ventilated classrooms, the temperatures were fairly steady, while in the open window classrooms the temperatures were variable. This was particularly the case in the Broadway School, which showed the best results and which has been noted for a variable classroom temperature.

It is generally conceded that the humidity of the fan ventilated classrooms was lower than the open window classrooms. This is generally true of all fan ventilated school buildings in the city of Cleveland in which a humidifier has not been installed. The results of the experiment show a greater prevalence of colds in classrooms with the lowest humidity.

REFERENCE

1. Duffield, Thomas J. School Ventilation Studies of the New York Commission on Ventilation. *Am. School Bd. J.*, Jan., 1928, p. 57.

SYRACUSE, N. Y.

THOMAS J. DUFFIELD

Executive Secretary, New York Commission on Ventilation, New York, N. Y.

THE School Ventilation Study in Syracuse was inaugurated during 1926. The first year's work has been described in numerous articles[1,2,3,4] which give information concerning the organization and method of study.

The study during the school year 1927–1928 followed the same general lines as during 1926–1927. There were, however, several differences worth noting. These may be summarized as follows:

1. Twelve schools with 4 different types of ventilation were included in the second study as against 6 schools and 3 types of ventilation in the first.

2. Respiratory illness among the pupils was taken as the criterion in the second study as in the first, but in the latter year the school nurses determined the inci-

dence of such illness among the pupils present, a function performed by the teacher during the earlier study.

3. In addition to the data on absences due to respiratory illness, absenteeism due to other illness was also recorded during the second year.

4. More complete data on air conditions in the classrooms were collected by a trained observer during the second year.

It should be pointed out that none of the schools included in this study complies with the recommendations of the earlier Commission. The new window ventilated schools in Syracuse have central fan exhaust systems which created, in so far as the rate of air change was concerned, conditions approaching those obtained by means of fan supply and exhaust systems.

The types of ventilation which have been under observation may be classified as shown in Table I.

TABLE I

NUMBER AND TYPE OF VENTILATION OF SCHOOLS INCLUDED IN THE SCHOOL VENTILATION STUDY, SYRACUSE, N. Y.

Type of Ventilation		Number of Schools	
Supply	Exhaust	1926–27	1927–28
Fan	Fan	2	4
Fan	Gravity duct	1	3
Window	Fan	0	2
Furnace	Gravity duct	3	3

By an arrangement with the Syracuse Board of Education through the School Health Service, under which the Commission provided supplementary nursing service during the year, it was possible to have the school nurses collaborate more closely with the study than during the previous year. The nurses kept the attendance and health record forms on which they entered for each session for each classroom included in the study:

1. Number of pupils on the active roll
2. Pupils present
3. Pupils absent
4. Pupils present with respiratory illness
5. Pupils absent because of respiratory illness
6. Pupils absent due to other illness

The information concerning the first three of these items was obtained from the teacher. By inspection of the pupils and questioning the teacher, the nurse determined the number of pupils present who in her opinion were affected with cold or sore throat. This provided the data called for in item 4. From physicians' certificates, excuses sent in by parents, and home visits, the nurses determined the number of pupils absent because of respiratory and other illness, required by items 5 and 6.

One of the serious deficiencies of the preliminary study of 1926–1927 was the lack of sufficient data on air conditions in the classrooms.

The teachers had kept a record of the dry bulb temperatures, but there was during the earlier study only a single series of observations of the relative humidity and the temperature distribution in the different classrooms, and there was no record of the rate of air change; nor of the air velocities in the different parts of the room.

During the second year, the teachers recorded the temperatures as during the first year. Through the generosity of the Taylor Instrument Companies, it was possible to install a dry and a wet bulb recording thermometer in one classroom of each school during the second study, and it is expected that these records will be extremely helpful in determining the air conditions prevailing under the different types of ventilation and in the different schools.

In addition to these records, the Commission was fortunate in having the services of an extremely able research engineer, Margaret Ingels, M.E., formerly a member of the staff of the Research Laboratory of the American Society of Heating and Ventilating Engineers, who during routine visits to the classrooms made the following observations:

1. Temperature distribution:
   a. Desk top temperatures at the corners and at the center of the seating section
   b. Floor temperature at the center of the seating section
2. Relative humidity:
   a. Sling psychrometer readings in two corners of the classroom
3. Rate of air change:
   a. Vane anemometer readings at supply and exhaust ducts
4. Air velocities:
   a. Kata thermometer readings at two corners of the seating section

Unfortunately, it has not yet been possible to complete the analysis of the attendance and health records with reference to these various air conditions, and for that reason this report will not deal with this phase of the subject.

The 1926–1927 study having indicated a rather close correlation between the incidence of respiratory illness in the mechanically ventilated schools and precipitation (see references 2, 4 and also "The Weather and the Common Cold," Report to the Committee on Public Health Climatology, Vital Statistics Section, American Public Health Association, 1928 *), the attendance and health records from the 1927-1928 investigation are being studied in the light of outdoor weather conditions as reported from the Syracuse Station of the U. S. Weather Bureau. This also is one of the phases of the analysis of the data that has not been completed at the time of this writing.

* See p. 1, this issue, "The Weather and the Common Cold.

As the analysis of data from the 1927–1928 study in Syracuse has not been completed, it is impossible to render a complete report at this time. There are, however, certain phases of the study that may be commented upon now, with the provision that such comments are tentative and subject to revision.

Table II shows the average number and average age of pupils and their percentage distribution by sex and nationality of parents for each school and type of ventilation included in the study during 1927–1928. The 6 schools included in the study during the first year were: Danforth, Seymour, Salem Hyde, Merrick, Montgomery and Townsend.

TABLE II

AVERAGE NUMBER AND AVERAGE AGE

PERCENTAGE DISTRIBUTION OF PUPILS BY SEX AND NATIONALITY OF PARENTS (ENTIRE YEAR)
By School and Type of Ventilation

School Ventilation Study, Syracuse, N. Y., 1927–1928

School	Average No. of Pupils	Average Age of Pupils	Percentage Distribution of Pupils by Sex		Percentage Distribution of Pupils by Nationality of Parents				
			Male	Female	American White	American Colored	Jewish	Italian	Other Foreign
Fan-Fan									
Danforth	380	9.5	49.9	50.1	86.6	—	4.7	2.9	5.3
Franklin	213	8.5	50.3	49.7	28.5	—	—	50.3	21.2
Madison	391	9.6	51.8	48.2	55.1	6.9	22.6	3.1	12.3
Seymour	522	10.0	49.3	50.7	64.1	1.0	0.9	18.1	15.9
Total	1506	9.6	50.2	49.6	64.2	2.1	7.4	14.9	13.2
Fan-Gravity									
Lincoln	426	9.2	50.6	49.4	92.9	—	0.7	3.9	2.5
McKinley	409	9.4	50.7	49.3	90.1	—	0.6	9.2	0.1
Salem Hyde	290	9.1	51.8	48.2	89.0	—	—	10.5	0.5
Total	1125	9.2	51.0	49.0	90.9	—	0.5	7.5	1.1
Window-Fan									
Elmwood	382	9.2	50.0	50.0	92.3	—	1.4	2.9	3.4
Wash. Irving	609	9.8	51.5	48.5	34.9	11.9	35.5	3.5	14.2
Total	991	9.6	51.0	49.0	57.0	7.3	22.4	3.2	10.1
Furnace-Gravity									
Merrick	243	8.8	48.7	51.3	92.0	—	2.7	1.0	4.3
Montgomery	310	9.7	49.2	50.8	53.6	3.2	13.2	7.4	22.6
Townsend	212	7.9	55.3	44.7	2.6	—	—	97.4	—
Total	765	8.9	50.7	49.3	51.7	1.3	6.2	30.3	10.5

The crude attendance and health records by type of ventilation but without regard to the racial characteristics of the populations of the various groups are presented in Table III.

TABLE III

CRUDE ATTENDANCE AND HEALTH RECORDS BY TYPE OF VENTILATION

School Ventilation Study, Syracuse, N. Y., 1926–1927 and 1927–1928

School Year	Total Absences	Abs. Due to R. I.	R. I. among Pupils Pres.	Total Incidence R. I.
	Total Attendance and Health Records [1]			
Mechanical Ventilation (Fan-Fan and Fan-Gravity)				
1926–27	7.2	3.0	12.6	15.6
1927–28	7.0	2.2	2.7	4.9
Mean	7.0	2.4	5.4	7.8
Natural Ventilation (Furnace-Gravity)				
1926–27	4.9	1.8	7.0	8.8
1927–28	5.7	2.1	4.2	6.3
Mean	5.4	2.0	5.4	7.4
Window-Fan				
1926–27	—	—	—	—
1927–28	9.0	2.4	2.5	4.9

1. Rate per 100 pupil sessions.

The rates of total respiratory illness given in Table III suggest that, while the naturally ventilated, furnace-gravity schools appeared to be clearly superior to the mechanically ventilated schools during the first year of the study, this does not hold true during the second year.

The rates for the two years show the total incidence of respiratory illness to be 5.4 per cent higher in the mechanically ventilated schools; the rates of respiratory illness among the pupils present are identical in the two types of ventilation, while the rate of absenteeism due to respiratory illness is 20 per cent higher in the mechanically ventilated schools (2.4 per cent vs. 2.0 per cent).

Analysis shows the great fluctuations between the findings in the two years to lie in the rates of respiratory illness among the pupils present in the classroom, although the absenteeism reported due to respiratory illness is 26.7 per cent lower in the mechanically ventilated schools and 16.7 per cent higher in the naturally ventilated schools during the second year.

A test, the details of which need not be examined at this time, showed that the influence of the personal equation of the nurses, who were making the inspections of the pupils present in the classrooms to determine the incidence of respiratory illness, was so great as to invalidate any conclusions based on comparisons of their reported findings. This leaves the absenteeism reported due to respiratory illness as the sole reliable index for judging which of the methods of ventilation is more conducive to the health of the pupils.

From the 1926–1927 study, it appeared that absences from school because of respiratory illness were much more frequent among pupils of American families, whereas the rate of respiratory illness among

pupils present was higher in the schools attended by pupils of foreign parentage. The same finding appears to be true during 1927–1928 as shown in Table IV.

TABLE IV

SUMMARIZED ATTENDANCE AND HEALTH RECORDS [1]

By Race Stock of Pupils
School Ventilation Study, Syracuse, N. Y., 1927–1928

Race Stock of Pupils	Total Absenteeism	Absences Due to Respiratory Illness	Respiratory Illness among Pupils Present	Total Respiratory Illness
Italian	4.0	1.6	10.5	12.1
American	6.7	2.7	1.9	4.6
Numerous	8.6	1.9	2.3	4.2
All Schools	7.2	2.3	2.9	5.2

1. Rate per 100 pupil sessions.

Absenteeism due to respiratory illness is a reliable index only when comparisons are made between schools attended by pupils of approximately the same racial characteristics. In view of the fact that 2 of the 3 mechanically ventilated schools in the Syracuse study during the first year, and 4 out of 7 such schools during the second year were attended by pupils largely of American parentage, whereas only 1 of the 3 furnace-gravity schools is attended by pupils of this group, it would be manifestly unfair to condemn mechanical ventilation simply because the schools with that type of ventilation showed higher rates of absenteeism due to respiratory illness. The data must be examined with reference to both the race stock of the pupils and the type of ventilation. Table V presents the information in this manner.

TABLE V

ABSENTEEISM DUE TO RESPIRATORY ILLNESS [1]

By Race Stock of Pupils and Type of Ventilation
School Ventilation Study, Syracuse, N. Y.

Type of Ventilation	Race Stock			
	All	Italian	American	Mixed
		1926–27		
Fan-Fan	2.9	—	3.5	2.5
Fan-Gravity	3.4	—	3.4	—
Furnace-Gravity	1.8	1.0	2.4	2.0
All	2.5	1.0	3.2	2.3
		1927–28		
Fan-Fan	1.9	1.9	2.2	1.7
Fan-Gravity	2.7	—	2.7	—
Window-Fan	2.5	—	3.3	2.0
Furnace-Gravity	2.1	1.2	2.5	2.2
All	2.2	1.6	2.7	1.9

1. Rate per 100 pupil sessions.

This table brings out the following interesting facts:

1. The schools attended largely by pupils of Italian parentage made the best showing both years, those with American pupils the worst, while those with pupils of many races occupied the intermediate position. This justifies the separate treatment of these groups.

2. In the various racial groups, the furnace-gravity schools made the best showing during the first year. This is also true of the schools attended largely by pupils of Italian parentage in the second year.

3. In the American group during the second year the school with fan supply and fan exhaust made the best record with the furnace-gravity school next, the schools with fan supply and gravity exhaust third, while the new school with window supply and fan exhaust was highest.

4. In the schools attended by pupils of numerous races, the fan-fan school had the best record during the second year, the furnace-gravity school the worst, while the window-fan occupied the middle position.

In contrast to the apparently clear-cut superiority of the furnace-gravity schools during the first year's study, the findings of the second year are contradictory and confused. This finding would seem to indicate that, in so far as the incidence of respiratory illness is concerned, more evidence is necessary before it is possible to say that one of the types of ventilation under investigation is superior to another.

REFERENCES

1. Relation between Respiratory Illness and Air Conditions in Certain Syracuse Schools—Contribution No. 1, New York Commission on Ventilation. *School and Society*, XXVI: 677 (Dec. 17), 1927.
2. Duffield, Thomas J. Effects of Mechanical and Natural Ventilation on the Health of School Children. *J. Am. Soc. Heat. & Vent. Eng.*, Apr., 1928.
3. Duffield, Thomas J. The School Ventilation Study in Syracuse, N. Y., during the School Year 1926-1927. *A. J. P. H.*, 18, 3: 326 (Mar.), 1928.
4. Duffield, Thomas J. The School Ventilation Studies of the New York Commission on Ventilation during the School Year 1926–1927. *Am. School Bd. J.*, Jan., 1928.

DISCUSSION

PROFESSOR C.-E. A. WINSLOW, of Yale University, presented for consideration the following summary of the results obtained in 8 studies in 6 different cities:

ABSENCES DUE TO RESPIRATORY ILLNESS
Per 1,000 Pupil Sessions

Place	Year	Fan Supply	Unit Ventilation	Furnace	Window-Fan	Window-Gravity
New York	1915–16	14				10
New York	1916–17	13				11
New Haven	1926–27	30	32			18
Cleveland	1927–28	21				20
Syracuse	1926–27	30				
Syracuse	1927–28	22		18	24	
Chicago, W.	1927–28	39		21		24
Chicago, N.	1927–28	41		40		18

RESPIRATORY ILLNESS IN ATTENDANCE

Per 1,000 Pupil Sessions

Place	Year	Fan Supply	Unit Ventilation	Furnace	Window-Fan	Window-Gravity
New York	1915–16	76				22
New York	1916–17	98				44
New Haven	1926–27	22	61			31
Cleveland	1927–28	109				45
Syracuse	1926–27	126		70		
Syracuse	1927–28	27		42	25	

Despite the many inaccuracies involved in respiratory disease records, Professor Winslow believed that the picture presented by the table is a striking and convincing one. Absences due to respiratory illness show, in every one of the 6 instances, an excess in fan ventilated rooms, as compared with rooms ventilated by the window-gravity method, and in 3 cases out of 4 this is also true of respiratory illness in attendance. This latter factor is a highly inaccurate one, subject to great variation according to the personal equation of the teacher or the nurse who makes the observations. On the whole, however, the conclusion can hardly be resisted that respiratory disease in window-gravity ventilated rooms is only two-thirds as great as in fan ventilated rooms. Unit ventilation, furnace heating, and window supply with fan exhaust, closely resemble fan supply in their results.

The theoretical explanation of these facts is however exceedingly difficult. The New York Commission on Ventilation originally believed that fan rooms were prejudicial on account of overheating, but in New Haven and Chicago the fan rooms were cooler than the window rooms, and yet showed a very marked excess of respiratory disease. Nor can differences in relative humidity be invoked to explain the observed phenomenon. There remain, as the two most probable hypotheses, the effects of local drafts, or some as yet mysterious influence upon the electrical condition of the atmosphere incident to passing over highly heated surfaces.

Meanwhile, Professor Winslow pointed out that, even though we do not understand the fundamental physiological processes involved, we have apparently ample ground for preferring window ventilation, with an air change of some 10 cubic feet per minute, to fan ventilation with a larger flow of warmer air. There is no other means, hygienic or bacteriological, by which it is possible to reduce by one-third the incidence of infections of the upper respiratory tract, yet this remarkable result can apparently be accomplished by the substitution of one type of schoolroom ventilation for another.

Chlorination as a Factor of Safety in Shellfish Production*

WILLIAM FIRTH WELLS, FELLOW A. P. H. A.

Biological Engineer, North Atlantic Oyster Farms, Inc., West Sayville, N. Y.

FROM the Atlantic Seaboard of the United States come four-fifths of the world's production of oysters. Wholesale condemnation of these growing areas should become a public health measure of the last resort, after all the possibilities of conservation by public health engineering methods have been exhausted. Elimination of pollution is the ideal solution, but as in the protection of public drinking water supplies, prevention has not kept pace with increased pollution, and as by analogy we find in fact many valuable areas which can be conserved only through safety factors applied to the product.

Extensive studies of shellfish conducted over a long period of years have discovered biological and sanitary principles which enable us to control, under artificial conditions, the functions essential to their self purification. The transitory contamination for which oysters have been held responsible is not a true infection of the oyster but a bacterial accumulation in the healthy act of feeding.

Without attempting to describe the intricate mechanism of an oyster's gill, whereby in the combined process of breathing and feeding it filters daily many gallons of water to derive therefrom the minute drifting microscopic life and matter which constitutes its food, it is sufficient to a working understanding of the operation to state that the entire inner surface exposed to any contamination from the water is coated with a continuously moving mucus layer which carries along the agglutinated particles by ciliary action. This layer, constantly renewed by the secretion of sterile mucus from within, resembles in action a belt conveyor. Originating in the gill or incurrent water chamber, it travels crosswise to the current from which the food is strained, slowly forward through the funnel-shaped mouth, enters the sack-like stomach cavity, passes through the short gut reaching the cloacal or gill effluent chamber, and is ejected some five hours after entering the shells.

* Read before the Public Health Engineering Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 16, 1928.

Bacterial contamination reaching the tissue surfaces through the feeding function is therefore by that same function progressing toward elimination. The significant fact in considering means for improving the sanitary quality of shellfish lies in the rapidity with which such matters are removed. Within a few hours the normal transit has been accomplished, and the bulk of accumulated material has been discharged in concrete masses from the animal. There remains but the problems of permitting or stimulating the natural bacterial elimination, while at the same time safeguarding the shellfish from recontamination.

It was further discovered that shellfish close tightly in the presence of considerable excess of free chlorine, thus protecting the interior tissues from its effects, but permitting the sterilization of everything exterior to the shells, and secondly, that the chlorine soon becomes neutralized, permitting the shellfish in pure salt water to eliminate rapidly by their natural functions all interior contaminating materials accumulated on the tissue surfaces.

Numerous experiments involving these principles, conducted since 1914, not only in this country but in England and France, have demonstrated the rapid reduction in bacterial contamination. A commercial plant for the cleansing of mussels has been in successful operation in England since 1916, and in New York State seven plants either for purifying oysters, or safeguarding the product during the conditioning operation have been constructed since 1922, treating some 250,000 bushels a year. As a result of promising studies by the Massachusetts State Department of Health, a plant for purifying soft clams is being installed, and suggestive results are reported in Rhode Island on the treatment of hard clams.

The action of New York State against the conditioning of oysters for the market in waters exposed to more or less direct local contamination, unless such waters are treated to a degree satisfactory to the Commissioner of Health, brought into prominence another aspect of the process. It has been the practice of several growers to store oysters in floats for a period sufficient to permit them to eliminate the food materials accumulated within their digestive tracts and on other tissue surfaces. Such a conditioning operation appears to enable long shipments in better condition and at the same time bring them clean to the table; and the use of chlorinated water prevents danger of recontamination after harvesting.

If the operation is carried out in accordance with the purification principles outlined, it not only secures the prevention of recontamination but to a high degree removes possible contamination from han-

dling. It constitutes therefore a factor of safety added to all oysters. Increasing experience continues to add new evidence that the greater danger does not lie in the growing area. Where the primary object is not to purify oysters from uncertified beds, but to eliminate chance contamination in the processes of preparation for the market, there is a striking analogy to the pasteurization of milk which may be sterile at the source but subject to contamination before it reaches the consumer.

The largest plant is capable of treating over 1,000 bushels of oysters a day in twelve shallow basins. Each basin is 11 by 22 feet and 2 feet deep. The oysters are supported by wooden racks which can be lifted to permit cleaning of the deposits which accumulate beneath. The salt water is pumped directly from the bay through a 200-foot suction line, and after chlorination is delivered 150 feet further into the basins. A hose stream of 150 gallons a minute permits the flushing of loose dirt from the oysters before closing the basins. Raised beveled edges insure drainage away from the basins, and the continual flushing of the concrete walks with chlorine water reduces to a minimum any chance of recontamination. This is further insured by maintaining an excess of chlorine in the basins in which oysters are being handled and throughout the working day changes of water containing several parts per million are frequently made. After the men have left the plant in the evening the water is drawn and refilling goes on with just sufficient chlorine to insure sterilization of the water without interfering with the functioning of the oysters. Before the men come on in the morning the basins are again emptied and refilled with stronger chlorine dosage again.

This plant has kept a bacteriological record of operation, and we are enabled to present the following statement of a year's results through the courtesy of the Bluepoints Company, Inc. Table I is a summary of a whole season's scores, classed according to the period of treatment, and shows the number and percentage of samples giving scores above 50, 5 and 0.5. There is a distinct decline in the percent-

TABLE I

RELATION BETWEEN SCORE AND TIME TREATED

Sept., 1926 to May, 1927		Per Cent Scores Above		
Hours Treated	No. Samples	0.5	5	50
0	68	89.7	63.3	42.7
0 to 6	123	76.5	44.7	17.9
6 to 12	97	69.1	29.9	6.2
12 to 24	96	59.4	17.7	2.1
24 to 120	96	56.2	19.8	1.0

age of samples exceeding these scores as the period of treatment increases up to 24 hours. Beyond this period the change is not so pronounced, which suggests that a still slight recontamination tends on the average to maintain the score in the vicinity of this minimum value. While definite conclusions can be drawn from this table of percentages, a clearer index of bacterial reduction can be derived from a study of the distributions of samples by the statistical method applied in Figure I, where these values have been plotted on the basis of normal probability. The test of fitness to such treatment is given by the degree to which three points of each series fall on a straight line, which would be the case with perfect chance variation. It may be seen that by this test the closeness is quite sufficient to draw the conclusions which follow.

It is obvious that, in any case of chance distribution of bacteriological results, considerable variation exists, and isolated values both higher and lower are obtained from a product whether good or bad. The proportion of samples, however, which give a high or low value furnishes a measure of quality, and we have chosen the median as that

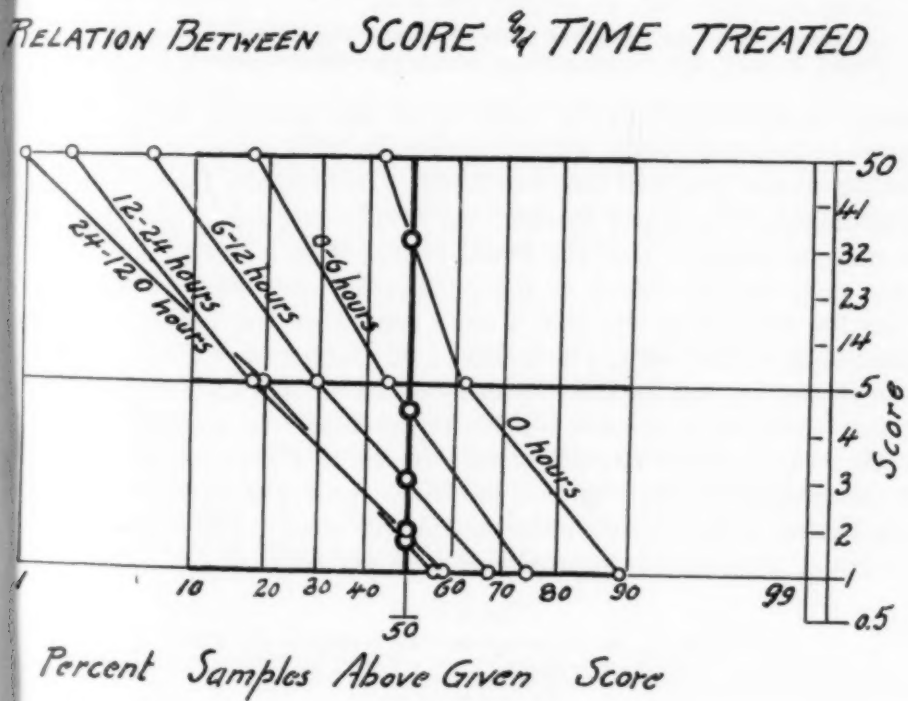

FIGURE I

Graphical determination of median score, from distribution of determined percentages of samples of oysters above given scores, plotted on Hazen's logarithmic probability paper.

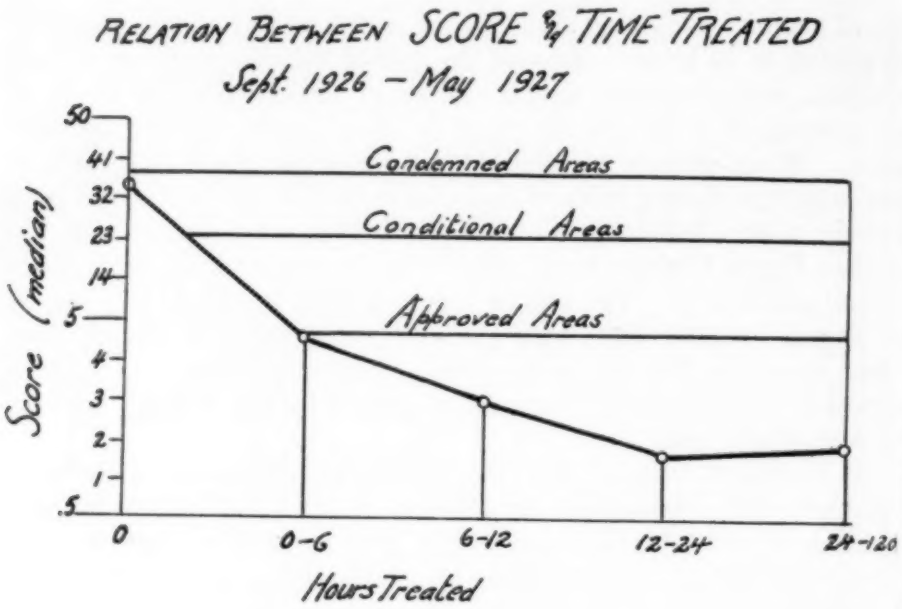

FIGURE II

Comparison of median annual scores of oysters, treated different periods in chlorinated sea-water, with median scores of oysters from classified grounds.

proportion which gives the most stable and accurate index of each series. In other words, we aim to discover that score which half the results would pass, and half would not. Incidentally the steepness of line indicates the degree to which the results vary from this value, and it may be observed that the initial results from a steeper line, which gets progressively flatter as the purification continues. This means that the treated oysters give a more consistent and uniform product than that started with, which should be credited as an advantage of the process beyond the mere lowering of the median score itself. Each heavy circle then includes a point representing the median score for each series. These have been transferred to Figure 11, which illustrates graphically the improvement in the oysters as they pass through the basins. The overall reduction in this score for the season after 24 hours' treatment is approximately 93 per cent.

TABLE II

SCORES FROM CLASSIFIED GROUNDS NARRAGANSETT BAY

(Averages of group percentages for 0–5–10–15° C.)

Area Class	No. Samples	Per Cent Scores Above 5	50
Approved	577	43.2	13.6
Conditioned	888	67.5	27.7
Condemned	638	83.7	35.5

The results of this practical performance may be interpreted by comparison with those from grounds classified according to the sanitary survey. The data collected by the State of Rhode Island during the years 1910–1915 give on Table II the values for three classes of grounds. They show on Figure II the striking similarity between the results from approved ground with those obtained by commercial treatment of oysters with results approaching those from grounds that have been condemned. From conditional grounds a wide margin of safety is provided. This margin will expand with the increased efficiency, through improved equipment and careful operation, represented by experimental results.

With liberal allowance therefore for all the actual and imaginary limitations which have been argued against purification processes, these results conclusively demonstrate the dependability of chlorination as a factor of safety, and show a wide and real margin of safety for oysters from conditional areas treated by the method as judged by its past commercial performance, and promise an increased margin of safety through improvements which inevitably result from continued practical operation. The sanitary quality of the resulting product under these conditions should represent a degree of safety equal and even exceeding that relied upon in oysters from approved grounds. Similar conclusions are reached by epidemiological evidence, which in America has so far failed to detect danger from the growing beds. The pollution load as so determined would, even with a Scotch verdict, be outweighed by any measurable reduction of infection risk, which need not exceed the status of a factor of safety.

CONCLUSION

The annual results of a large commercial plant show, without anticipation of improvement in efficiency indicated by experiments now in progress, that the method of treating oysters in chlorinated sea water is sufficiently well established at the present time to warrant a definite statement of its underlying principles, its achievement in practical operation, the field of its usefulness to the shellfish industry and the security it offers to public health.

BIBLIOGRAPHY

Houston, Sir Alexander. *Fourth Report of the Royal Sewage Commission of Great Britain*, 1904.

Fuller, George W. Concerning sewage disposal from the standpoint of pollution of oysters and other shellfish, and especially with reference to their transmission of typhoid fever. *J. Franklin Institute*, CLX, 2: 81–126 (Aug.), 1905.

Phelps, Earle B. Some experiments upon the removal of oysters from polluted to unpolluted waters. *A. J. P. H.*, 1, 5: 305–308 (May), 1911.

Johnshone, James. The method of cleansing living mussels from ingested sewage bacteria. *Report of Lancaster Sea Fisheries Laboratory*, Liverpool, XXIII: 57–108, 1915.

Wells, William Firth. Purified oysters. *Nation's Health*, V: 12, 1923.

Roure, Marie Claire. De la sterilisation de l'eau de mer et de l'epuration des huitres par le chlore. Montpellier, 1924.

Krumwiede, C., Park, W. H., Cooper, G., Grund, M., Tyler, C., and Rosenstein, C. The chlorine treatment of contaminated oysters. *A. J. P. H.*, 16, 3: 263–268 (Mar.), 1926.

Wells, William F. Artificial purification of oysters. *Reprint No. 351, Pub. Health Rep. 31*, 28, 1916.

Carmelia, F. A. Hypochlorite process of oyster purification. *Pub. Health Rep. 36*, 876–883, 1921.

Hunter, Albert C., and Harrison, Channing W. Bacteriology and chemistry of oysters with special reference to regulatory control of production handling and shipment. *Tech. Bull., U. S. Department of Agriculture, No. 64*, 1928.

Ministry of Agriculture and Fisheries of Great Britain. *Annual Reports on Sea Fisheries*, 1916–1928.

New York State Conservation Commission. Annual reports for 1920–1927. Also Rules and regulations governing water storage of oysters, 1925.

Illinois State Department of Health. Rules and regulations for sanitary control of fresh oysters and clams (with amendments), in force September 1, 1928.

Special report of Department of Conservation (assisted by the Department of Health) relative to the feasibility of transplanting shellfish from contaminated areas to clean waters. State of Massachusetts, *House Documents No. 252*.

Harris, L. I. Features of public health interest of recent typhoid fever outbreak. New York City Department of Health, *Month. Bull.*, 15: 50–60.

Park, W. H., and Williams, Anna W. *Pathogenic Microörganisms*, 1924.

Rosenau, Milton J. *Preventive Medicine and Hygiene*, 1927.

DISCUSSION

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MR. WELLS' paper is a conservative and lucid expression of the present status of the shellfish industry in relation to its public health aspects. With the exception of milk none of our raw food supplies has been subject to the same degree of hazard between point of origin and the consumer as has shellfish. It is inevitable therefore that with so important a food supply, methods should be found to eliminate to a large extent the hazards and to create a feeling of greater confidence on the part of the consuming public than has previously existed.

It is creditable to the shellfish industry that it has had the vision to tackle its problems on a scientific basis and that it has also had the courage to put into practice a unique sterilizing method based both on the efficacy of chlorine and the physiology of the shellfish.

So far as has yet been brought out the chlorination treatment has reasonably met expectations and improved the score without impairing in any way the market value and edibility of the product. It is to be assumed that better results will be obtained as experience becomes available from plants now in operation or under construction.

A more or less general adoption of the chlorination method involves two main considerations, as has been indicated by Mr. Wells. First, is the improvement of the score and the establishing of a substantial safety factor for shellfish now taken from approved areas beyond polluting influences. The advantage of the highest feasible safety factor will be readily conceded by both the producer and the consumer.

The second consideration involves the proposal to make use of areas ecologically suitable for shellfish culture but subject to a degree of pollution which would make their use questionable in the absence of some such sterilizing treatment as has been proposed for overcoming pollutional hazards. It is quite logical to assume that present growing areas will be extended in this manner as confidence becomes established in the sterilizing method. Steps in this direction must be made cautiously however, because the safeguards depend not only upon soundness of the method but upon the kind of plant equipment employed and the adequate character and performance of the operating personnel.

The first water filtration plants and first milk pasteurization plants did not closely approach in reliability of performance the later ones, nor were the operators of these plants so well trained and equipped as those who came after them.

A factor of no little consequence to the shellfish industry is the development of public opinion so that sewage and other wastes of seashore and related communities will be taken care of satisfactorily. The restriction of the present shellfish areas is due largely to inadequacy of municipal sanitation. Such a situation is susceptible of correction if public opinion can be brought suitably to its support. Improved methods of safeguarding shellfish are no more excuse for slackening sewage treatment than is the construction of a modern filtration plant an excuse for substantial pollution of the raw water supply. Neither does pasteurization give a license to insanitary handling of milk.

The standing of chlorination as applied to shellfish depends largely upon the results obtained with the method in the hands of various workers and the relation of such results to conditions where there is substantial pollution.

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THE possible usefulness of the standard method of scoring oysters for *B. coli*, especially in so far as it may be applied to the control of the market product, is materially curtailed by the time required to obtain a final confirmed score on a given sample. A new method has been recently tried out in our laboratory, by which fuller information on the coli aerogenes content of oysters may be obtained in a shorter time.

Mr. Noble of our research staff has been experimenting with the application to oyster scoring of a new cyanide citrate pour plate method originally designed for water analysis.

The most interesting and striking feature of the findings by the new procedure is the indication that the *B. coli* score of oysters, as they reach our market, is principally a *B. aerogenes* score rather than a *B. coli* score. The significance of this finding at present is, of course, debatable, yet I must confess that it gave us a sense of relief to know that the high scores we have encountered were not usually due to the definite fecal type of organism.

R. E. NOBLE

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AT this time we are prepared to state only approximate but interesting figures. We have found that in at least 90 per cent of positive samples the aerogenes types predominated. In these samples the ratio of aerogenes to coli colonies was usually very high and coli types were generally absent. Plate scores of total coli-aerogenes organisms, determined in a manner corresponding to the standard score, usually equalled or exceeded the latter. Plate counts may be less, equal to or greater than the standard score for a given volume of sample which, we believe, is explainable in terms of dilution. For example: a plate count from a 1 c.c. inoculation may show a count of 60 while the 0.1 c.c. and 0.01 c.c. portions in fermentation tubes are positive. Tentatively the conclusion is suggested that this plate method is suitable for oyster analysis and may be used with considerable saving of time in arriving at a confirmed *B. coli* score.

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CAN PREVENTION GO TOO FAR?

CONTAGIOUS diseases can be prevented in two ways—complete isolation, which was attempted by our forefathers with greater success than is possible at present; and immunization, which may be acquired by what we call natural methods or by vaccination. The great success of vaccination against smallpox, and the methods introduced by Wright, have led to the tremendous use of artificial immunization by means of attenuated or killed bacteria or their products.

One may well ask if we have not gone too far in some respects, and if we have not made a mistake in trying to do away with nature's methods of producing immunity. As regards passive immunity, this question is of especial importance, since it is of short duration, and it is well known that when a contagious disease invades virgin territory, it rages with unusual violence. Where an active immunity can be produced by a vaccine, which is comparable to that following an attack of the disease under what may be called natural conditions, the work of man is all to the good.

Even in measles, which is generally regarded as 100 per cent infective, several observers have shown that in epidemics in regions where the disease is seen year after year, the history of previous attacks does not account for all who escape infection. The same statement may be made in regard to influenza, which is also highly contagious. The apparent immunity of those who escape such infections is explained on the ground that repeated small doses of the causative germ, not enough to produce symptoms recognizable either by the patient or by the physician, have produced a strong and lasting immunity. In certain other diseases which are not so highly infectious, such as diphtheria, infantile paralysis and meningitis, the same thing has been observed and fairly well proved.

It is well recognized that the germs of the acute diseases which we most dread are taken in through the upper respiratory tract and given out through the same channels. The droplet infection of Flügge has come to be recognized as of prime importance. Experiments have taught us how far germs can be carried by sneezing and coughing, and the conditions which influence the time they may remain suspended in the atmosphere.

Those responsible for the health in schools have especial reason to consider this mode of infection. In a somewhat loose method, it has been held that the ordinary contact during class periods of one hour is not sufficient time for infection to take place, though occasionally we have had cause to doubt the correctness of this claim. Observations in schools having both resident and day pupils have shown that during outbreaks of diphtheria and scarlet fever the residents were largely infected, while the day pupils remained completely free. The only discernible difference between the two was that the former slept together in dormitories, while the latter slept in separate homes.

Such facts have led Dudley to conclude that under ordinary conditions contact in classrooms for one and one-half hours, as well as the shorter periods on the playgrounds, were not sufficient to produce symptomatic infection. He has also observed that on naval vessels where overcrowding is present, but where ventilation is good, there is a remarkable freedom from contact infections. In the Navy, however, the men have gone through a period of training on shore which has resulted in a certain number of cases of disease and the apparent immunization of the majority.

In certain diseases the droplets are expelled to greater distances than others, owing to the explosive character of their projection. In meningitis, for example, separating the beds by 2½ to 3 feet has been shown to be sufficient to prevent infection; while in such diseases as common colds, influenza and diphtheria, the distance should be considerably greater—the further apart, the better. The separation in linear distance between the faces of individuals is of much more importance than the number of cubic feet of air space per person.

These and other considerations along the same lines have led certain epidemiologists, especially Dudley, to the conclusion that it is inadvisable to reduce too far droplet infection and the immunization produced by it. "Preventive Medicine deals with the herd, not with the individual." Recognizing the apparent cold-bloodedness of the view that individuals must suffer for the benefit of the many, Dudley makes the plain statement that in his own work he would be loath to do away with droplet infection from the naval training establishments

where young boys are converted into seasoned men by adaptation to the bacterial environment with which they must come into contact in their calling. The same reasoning may be applied, to a certain extent at least, to schools.

Many of the ideas expressed are not new, but Surgeon-Commander Dudley[1] has assembled them, with a number of corroborative facts, in a dissertation marked by originality as well as careful reasoning. Doubtless some will consider his ideas revolutionary, but we can commend them to the thoughtful consideration of all who are interested in this most important problem.

REFERENCE

1. *Lancet*, Oct. 27, 1928, p. 849.

THE CALMETTE–GUÉRIN VACCINE

ATTEMPTS at vaccination against tuberculosis are not new, but all of them up to the present have been failures, though in laboratories certain experiments have had definitely successful results, among which we may mention those in this country by Pearson and Gilliland, at the University of Pennsylvania. In practice, however, we know of no method, either in animals or in man, which has been generally successful, though the laboratory work referred to has been sufficient to keep us hoping and to make us believe that someone will solve the problem in the not far distant future.

For a number of years we have followed eagerly the experiments of Calmette and Guérin, who succeeded in reducing the virulence of a mammalian tubercle bacillus through more than 20 years of cultivation upon a medium containing bile. After 4 years of such cultivation, it had lost its virulence for cattle, and after 13 for all experimental animals, though inoculated animals would react to the tuberculin test, and the germ itself would produce tuberculin. The ability and scientific honesty of Calmette, with his persistence and experience, have given unusual interest to his reports, the most recent and extensive of which are found in his book,[1] published in 1927, and in the current volume of the *Annals of the Pasteur Institute*.[2]

As far as the vaccination of animals goes, we have two recent and authoritative reports. The first[3] gives a series of experiments with guinea pigs. When the infecting dose was reduced to its lowest effective limit, the vaccinated animals were shown to live longer than the unvaccinated, and 6 of the vaccinated, when killed 20 weeks after the death of the last unvaccinated animal, were found to be free from tuberculosis. The authors feel justified in believing that guinea pigs may be completely protected against minimum doses of virulent

tubercle bacilli by means of BCG. Experiments upon guinea pigs, rabbits and young calves at the Research Laboratories of the Department of Agriculture of Canada[4] do not give such favorable results. In a pathogenicity test of BCG made on 134 guinea pigs, 92 were without a trace of tuberculosis when killed, while 30 showed infection, which in some cases appeared active and in others arrested or undergoing resorption. In the early experiments, 6 died of tuberculosis. The authors concluded that the vaccine could not be considered free of pathogenic power, and further showed that the virulence could be exalted by serial passage through guinea pigs; results which are in serious disagreement are those reported by Calmette, Guérin and others. The same workers found that young calves which after vaccination were exposed to natural infection by living with tuberculin reacting cows showed no greater resistance than the controls.

The authors consider that vaccination with BCG is still in the experimental stage, and that the claims made for its harmlessness are open to question.

In 1927, Calmette made an important modification in his vaccination of calves; namely, isolating them from possible infection for 30 days after vaccination, which indicates that his former procedure had not been entirely satisfactory.

These experiments have a direct bearing on the use of BCG for the protection of children. Calmette and his coworkers report on 3,808 children[2] and compare the deaths among these—3.1 per cent—with the general rate of mortality for the first year of life in France for 1922, which was 8.5 per cent. This report has been severely criticised. One is almost forced to believe that the favorable reports of the authors show an undue degree of optimism.

The most that we feel justified in saying is that the whole matter is in the experimental stage, but is in the hands of competent and experienced observers. It may be true, as some claim, that the use of BCG carries danger of infection to the child. Especially in view of the dissociation into two types, one virulent for guinea pigs and the other not, demonstrated by Petroff,[5] we are obliged to hold that the safety of the procedure has not been proved, and for the present must recommend caution in the use of the vaccine while hoping for the best.

REFERENCES

1. La Vaccination Préventive contre la Tuberculose par le BCG.
2. *Ann. de l'Inst. Pasteur*, 42: 1–34, 1928.
3. Okell, C. C., and Parrish, H. J. Vaccination of Guinea Pigs against Tuberculosis with B. C. G. *Brit. J. Exper. Path.*, 9: 34–42, 1928.
4. Researches on Bacillus-Calmette-Guérin and Experimental Vaccination against Bovine Tuberculosis, E. A. Watson. (To appear in *J. Am. Vet. Med. Assn.*)
5. Petroff, S. A., and Branch, Arnold. Bacillus Calmette-Guérin (B. C. G.). *A. J. P. H.*, XVIII, 7: 843 (July), 1928.

A REPORT WITH REAL MEAT

THE recently issued report of the Malaria Commission,[1] Health Section, League of Nations, is notable not only for the sound advice on its special problem, but also for the clear enunciation of fundamental principles applicable to all types of public health work. The commission considers it inadvisable to utilize "all available methods of control in the same locality at the same time," preferring to employ first those methods which can be raised above the standard called "minimum effective degree of perfection," this depending upon the means available. Each locality should be studied and methods of control adapted to the region put in force, since measures which are successful in one area may fail in others, owing to different conditions.

Malariologists have widely divergent views which are vigorously defended. Each proposed method varies according to its necessities, efficacy and cost, these in turn depending upon social and economic conditions. These differences of opinion exist in spite of the fact that the basic principles of malarial control are well understood and have been proved efficient in practice. Malaria flees before scientific agriculture. "Integral bonification," a term obtained from Italy, meaning the complete reclamation of land for agricultural purposes by any method or any combination of methods, requires a long time for accomplishment. While this is the ultimate object of antimalarial work, the commission recognizes that the first step must be early diagnosis and treatment of infected persons.

Among other fundamentals, the report points out that each case requires observation and analysis of the factors involved, but "The principal factor in the success of any method is the energy of the hygienist employing it."

Hygiene has often suffered from an excess of zeal on the part of its friends combined with a deficiency of knowledge; for instance, the wholesale slaughtering of cattle on the tuberculin test, the latter often carried out under conditions which precluded the possibility of reliable results. Vaccination against smallpox has suffered at the hands of its over enthusiastic advocates who did not know, or neglected to recognize, the fact that the duration of immunity is variable, so that vaccination with re-vaccination must be taught as well as practiced. Examples might be multiplied, but these will suffice.

Every popular movement attracts undesirable elements to its support, some carried away by an excess of zeal, but some who wish to ride on the crest of the wave for financial or other reasons. In perhaps no other profession is the old saying concerning a little learning being a dangerous thing more true than in public health. Signs are

not lacking of a reaction against the fallacious teaching and practices of underinformed enthusiasts. A letter on "Debunking Health Education"[2] illustrates this. So-called health education, as well as practices founded on "bunk," leads inevitably to the discredit of the efforts of those who are sincere as well as trained, the foundation of cults, and the putting on the market of various foods and preparations for which miraculous claims are made. The list of food fads alone would fill pages. We need only mention the war against white bread, raisins for iron, the alleged effects of constipation or of eating hot food in causing cancer, and so on *ad nauseam*.

As long as the world goes round, a regular crop of fakirs and "suckers" will be produced, each to supply the demand for the other. Well may we pray: "O Lord, make all the bad men fools," since fools seldom attract a large following. Unfortunately most "fakirs" are smart, and know how to play upon human nature. It takes the philosophy of an Oliver Wendell Holmes or a William Osler to accept conditions with equanimity.

We dislike the rôle of preacher, but it seems clear that we must continue our efforts for higher standards of education. For those desiring to engage in public health work or public health teaching, a minimum standard of education should be required, and also a license similar to that required for physicians or lawyers. There is no more reason why the degree of Doctor of Public Health should be sufficient to turn a person loose on the public than there is for the degree of Doctor of Medicine to give the right to practice. All physicians must be licensed after having obtained their degrees, irrespective of the standing of the school from which they graduate. This view is perhaps Utopian, but our aim must be high, even though for a time we may fail in accomplishment.

REFERENCES

1. *Pub. Health Rep.*, Nov. 9, 1928, p. 2957.
2. *J. A. M. A.*, Oct. 6, 1928, p. 1055.

THE GOVERNMENT AND THE PUBLIC HEALTH

THE Executive Council of the American Medical Editors' Association has adopted a resolution declaring the sentiment of the association to be that there should be a medical officer in the Cabinet of the President of the United States. The work of such an officer would be to "look after the interests of the medical profession, and to represent the public health of the nation."

We believe that the medical profession is a unit, in the opinion that there should be a department headed by a cabinet officer for the pur-

pose of directing the welfare of the nation in regard to public health. History is full of instances showing that good health is the greatest single asset which any nation can possess, and this has been recognized by statesmen for many years. All of us are familiar with the statement of Disraeli, "The Public Health is the foundation on which reposes the happiness of the people and the power of a country. The care of the Public Health is the first duty of a statesman," and endorse it. Gladstone said: "In the health of the people lies the strength of the nation."

Nations which are at war recognize the practical bearing of such statements. The commanding general of an army demands that the sick report be made early each day, as he is compelled to know what effective force he can count upon. Strangely enough, there is no such report in times of peace, and we can only guess at the number of disabled and dependent persons in our nation. The most severe charge that can be made concerning this is the well known fact that a large percentage of the disablement is due to preventable and remediable conditions. This was clearly shown in the draft examination during the World War. England and Canada acted on what they learned during that period, and now have cabinet ministers in charge of national health.

If any business were conducted as inefficiently, in regard to bookkeeping as well as practice, as its health matters are conducted by our country, it would go to the wall in a short time. If anything good can be said about war, it is that it has brought to the attention of the nation a condition of affairs which calls loudly for remedy. That conditions are not worse than they actually are is due to the numerous volunteer health organizations which have done, and are doing, such splendid work in various specialties, and which are arousing public opinion. We must also pay our sincerest tribute to the U. S. Public Health Service; but our national organization is such that it is hampered in functioning within the states.

Under the fear of an epidemic of yellow fever, we once undertook the experiment of a National Board of Health, but it was continued only 4 years, though some of its functions were then delegated to the U. S. Public Health Service.

The resolution of the American Medical Editors' Association seems to us to fall short of meeting the necessities of the case, though it is a step in the right direction. We have all watched the movement for the reorganization of the governmental departments in Washington, and are still hoping to see this come to full fruition. In any reorganization which is finally achieved, the health of the nation must take a prominent place.

Our Association has for 3 years endorsed the Parker Bill, which we believe comes much nearer to what is wanted by the people of the country, and what is needed, than merely having a medical officer in the Cabinet. It was passed by the Seventieth Congress, but vetoed by the President. At our recent meeting in Chicago a resolution was adopted urging Congress to pass the Bill over the veto.* It behooves all members of our Association to bear this in mind when Congress convenes, and to use all possible influence on their Representatives.

The great French philosopher Descartes said: "If ever the human race is raised to its highest practicable level, intellectually, morally and physically, the science of medicine will perform the service."

* *A. J. P. H.*, 18, 11: 1399 (Nov.), 1928.

CONSTITUTION AND BY-LAWS, AND CONSTITUTION FOR SECTIONS, AMERICAN PUBLIC HEALTH ASSOCIATION

As Amended by the Governing Council at the Fifty-seventh Annual Meeting, Chicago, Ill., October 15–19, 1928

CONSTITUTION

ARTICLE I NAME

The name of this Association, incorporated under the laws of Massachusetts, is the American Public Health Association.

ARTICLE II OBJECT

The object of this Association is to protect and promote public and personal health.

ARTICLE III GOVERNING COUNCIL

A. *Composition:* There shall be a Governing Council consisting of:

1. The officers of the Association.

2. Thirty members of the Council, to be elected by and from the Fellowship of the Association, for three-year terms, one-third retiring each year. These members of the Council shall be nominated and elected as provided for in the By-laws.

If one of these members is elected a Section Chairman, Vice-Chairman, or Secretary, or appointed the representative of an Affiliated Society, a new Councilor to fill such vacancy shall be elected by the Governing Council.

3. The Chairman, Vice-Chairman and Secretary of each Section.

4. A representative to be appointed by each affiliated society to serve for one year. Such representative shall be at the time of his appointment a Fellow of the American Public Health Association.

5. The elective members of the Council of the Health Officers Section.

B. *Terms:* Terms of Councilors shall begin at the end of the annual meeting when elected, and shall terminate at the end of the annual meeting at expiration of term; provided that Councilors shall have the right to attend meetings of the Council in an advisory capacity as soon as elected.

C. *Reëlection:* After two consecutive terms, an elective Councilor shall be ineligible for reëlection to the Council during one Association year.

D. *The Officers* of the Association shall be the officers of the Council.

E. *Functions:* The functions of the Council shall be:

1. To establish policies for the Association and for the guidance of the Executive Board and the officers.

2. To establish Sections of the Association, to combine or discontinue them when necessary, to maintain coördination among them, and to formulate general rules governing the policies of the Sections.

3. To submit to the vote of the Association all resolutions which have received the approval of the Governing Council.

4. To elect Affiliated Societies, Fellows and Honorary Fellows as provided in the By-laws.

5. To elect the Executive Board and the officers of the Association.

6. To receive from the President, on behalf of the Executive Board, a report of the meetings, policies and work of the Executive Board; a report from the Executive Secretary concerning the administrative work of the year; and a report from the Treasurer concerning the finances of the Association.

F. *A Quorum* of the Council shall consist of ten Councilors.

G. *Meetings* of the Council shall be called by the Executive Secretary at the request of the President, or at the request in writing of any twelve Councilors. In the latter case, the call to meeting, issued at least twenty days in advance, shall state the purpose of the meeting

ARTICLE IV OFFICERS

The officers of this Association shall be a President, three Vice-Presidents, an Executive Secretary, and a Treasurer. The officers, with the exception of the Executive Secretary, shall be elected by written ballot of the Governing Council as provided in this article and in the By-laws. Officers shall serve from the close of the annual meeting when elected, until the close of the next annual meeting, and until their successors are elected and qualified. A majority vote of the Councilors voting shall be required to elect, and if no candidate receives a majority vote on the first ballot, the candidate receiving the smallest number of votes shall be dropped after each ballot in succession until a majority vote is obtained. The Executive Secretary shall be elected by and serve at the pleasure of the Executive Board.

ARTICLE V AMENDMENTS

This Constitution may be amended by a two-thirds vote of the Members of the Association present and voting at an annual meeting, provided that the specific amendment to be acted upon is published in the official publication of the Association not less than thirty days prior to the meeting, and provided further that the amendment has received the approval of the Governing Council.

BY-LAWS

ARTICLE I MEMBERSHIP AND DUES

A. There shall be a standing Committee of the Governing Council on Eligibility, consisting of one Fellow from each established Section to be appointed by the President, with terms of three years each, as equal a number as possible expiring each year, the terms of those first appointed to be determined by lot conducted by the Executive Board; this committee to perform such duties as may be specified herein, and such other duties as may be assigned to it from time to time by the Governing Council.

B. There shall be eight classes of constituents who may be elected from the United States, Canada, Mexico, Cuba, and such other countries as may be admitted to representation in the Association. This provision shall not apply to Honorary Fellows or Associate Members. The respective appellations, qualifications for election, and dues shall be as follows:

1. *Fellows:* Only professional health workers, who have been Members of the Association for at least two years, and of established professional standing (whether employed by public or private agencies or in independent private practice), shall be eligible for election as Fellows, provided that a Member shall be not less than thirty years old at the time the application for Fellowship is made, and provided, further, that the following persons shall be considered to have an established standing in the profession of public health, namely:

a. A person who has attained the degree of Doctor of Public Health, Doctor of Science in Public Health, Doctor of Philosophy in Public Health, or other equivalent degree, according to standards approved by the Executive Board of the American Public Health Association.

b. A person who has attained an academic or professional degree involving training in public health, and who has been regularly engaged in public health work for four years, having rendered meritorious service in the public health profession, either as a health officer or in responsible charge of work in a state or municipal department of health or other official public health organization.

c. A person who has done notable original work in public health or preventive medicine of a character to give him a recognized standing equivalent to that required for Fellows under paragraphs "a" and "b."

d. A person regularly engaged in public health work for at least five years, who has given evidence of special proficiency in the service of an official or unofficial public health organization, and who has attained a professional standing equivalent to that required for Fellows under paragraphs "a" and "b."

e. A teacher of public health or one of its constituent sciences. As such he shall have attained distinction as an expounder of the principles of public health or its constituent sciences and he shall have had at least five years' experience as a teacher of public health subjects. Any years of experience as defined in paragraphs "b" and "d" that the applicant may have had shall be considered the equivalent of the same number of years experience as a "teacher."

f. A person not covered by the above, who has made substantial contributions to public health work in his chosen branch of public health service, and who has attained a professional standing equivalent to that required for Fellows under paragraphs "a" and "b."

The application for Fellowship shall be made on an approved form and shall be sponsored by two Fellows of the Association who shall be Fellows of the Section with which affiliation is desired, provided, however, that when affiliation with a Section is not desired, the sponsors may be any two Fellows in good standing in the Association. Fellows without Section affiliation shall be known as unaffiliated Fellows.

When the application has been duly sponsored and otherwise completed, it shall be transmitted to the Executive Secretary of the Association, who will make note thereon of such knowledge as he may have concerning the standing of the applicant in the Association. The application shall be forwarded by the Executive Secretary to the Secretary of the Section in which affiliation is desired, for the approval of the Section Council, and when acted upon by the Section Council, it shall be returned to the Executive Secretary by the Secretary of the Section, after he has made endorsement on the application of the action of the Section Council. When the application is for unaffiliated Fellowship, the Executive Board of the Association shall act in place of the Section Council. When the application has been approved by a majority of the Sec-

tion Council or the Executive Board, as above provided, it shall be voted upon by the Governing Council, provided the name of the applicant shall have been officially published at least fifteen days in advance, and provided further that the application shall have been approved by the Committee on Eligibility.

A Fellow may belong to and vote in only one Section, but such affiliation may be transferred to another Section if approved by vote of a majority of the Council of the latter Section. Unaffiliated Fellows may become affiliated with a Section if approved by vote of a majority of the Council of the Section in which affiliation is desired.

The right to hold office or to serve as chairman of a committee in the Association shall be limited to the Fellows of the Association, whether Section Fellows or unaffiliated Fellows. The right to hold office or to serve as chairman of a committee in a Section shall, however, be limited to the respective Fellows in such Sections.

The dues of Fellows shall be $10.00 per year.

2. *Honorary Fellows:* Honorary Fellows may be elected by the Governing Council for distinguished service in public health. Honorary Fellowship shall not include voting power or payment of dues.

3. *Members:* Persons professionally engaged in public health work shall be eligible for election as active Members when sponsored by two Fellows of the Association. They may serve on committees, except as chairmen. Dues $5.00 per year. A Member may belong to only one Section but such affiliation may be transferred to another Section if approved by vote of a majority of the Council of the latter Section. Unaffiliated Members may become affiliated with a Section if approved by vote of a majority of the Council of the Section in which affiliation is desired.

4. *Associate Members:* Persons interested in public health shall be eligible as Associate Members. They may serve on committees, except as chairmen. Dues $5.00 per year.

5. *Sustaining Members:* Individuals or corporations interested in public health may be elected to Sustaining Membership. Dues $50.00 or more per year.

6. *Affiliated Societies:* A state or provincial public health association or similar regional society including more or less than a state, primarily composed of professional public health workers and organized for the same general objects as the American Public Health Association, may be elected as an Affiliated Society, provided that not less than twenty of its active members and at least one-half of its active members are Members or Fellows of the American Public Health Association. Not more than one such society shall be admitted from the same area.

A society applying for affiliation shall submit a copy of its constitution and by-laws, its last annual budget, a roster of its members and such other evidences of its qualifications as it may desire to submit.

The Committee on Eligibility shall consider all applications for affiliation and report its recommendations to the Governing Council.

The annual dues of Affiliated Societies shall be one per cent of their gross annual income, the minimum dues per society being $10.00 per year.

Each Fellow, Member, Associate Member, and Affiliated Member of the American Public Health Association shall be a member of the Affiliated Society to which he is eligible and, after January 1, 1927, no person eligible for election to an Affiliated Society shall be admitted to Membership, Associate Membership or Affiliated Membership in the American Public Health Association unless such person has qualified or at the same time qualifies as a member of an Affiliated Society.

For every Fellow, Member, Associate Member or Affiliated Member paying annual dues to the American Public Health Association, the American Public Health Association shall remit to the Affiliated Society of which such person is a member the sum of $1.00 per annum.

7. *Affiliated Members:* This class of membership shall include all active (namely professional) members of Affiliated Societies, and in areas where no Affiliated Societies exist such other professional sanitarians as may be elected to this grade. Dues $1.00 per year.

8. *Life Members:* Upon the recommendation of the Committee on Eligibility any individual member of the Association may be elected a member for life. Election to this grade shall not affect the privileges held by such individual in his previous grade of membership. The dues for Life Members shall be $100.00, payable within one year after election, and this payment by such member shall exempt him from any further dues.

C. *Election:* The election of Fellows (see A1 above), Honorary Fellows and Affiliated Societies shall be by the Governing Council.

The election of Members, Associate Members, Life Members, and Sustaining Members shall be by a committee appointed by the Executive Board.

Three-fourths of the votes cast shall be requisite for election.

Upon the recommendation of the Committee on Eligibility the Governing Council may discontinue the Membership, Fellowship or

affiliation of any constituent. Three-fourths of the votes cast shall be necessary for such action.

D. *Dues:* Dues are payable annually in advance. All constituents paying dues shall be entitled to receive the AMERICAN JOURNAL OF PUBLIC HEALTH and, or, such other publications as may be designated by the Executive Board, which shall determine the proportion of dues to be devoted to this purpose.

Constituents of any class whose dues are unpaid for six months or more shall be considered not in good standing. Constituents not in good standing shall not be entitled to vote, hold office or enjoy other privileges or powers of membership. Good standing may be resumed upon the payment of all arrears and dues in advance for one year, provided, however, the lapsed period is not greater than one year. The Executive Secretary shall notify by registered mail all constituents who have been in arrears for a period of eleven months. The names of constituents in any class whose dues remain unpaid for one year or more shall be presented to the Executive Board which shall order the names of such constituents stricken from the Membership roll, provided, however, such constituents have been duly notified as hereinbefore provided in this paragraph. Constituents whose names have been stricken from the rolls in this manner may be again admitted in the manner provided for the election of new constituents in the class for which they make application provided such person or organization complies with the eligibility requirements at the time the new application is made.

ARTICLE II GOVERNING COUNCIL

At least four months before the Annual Meeting the President with the approval of the Executive Board shall name a Nominating Committee of not less than three Fellows, no two of whom shall be from the same Section of the Association or the same state. This committee shall present to the Executive Secretary at least two months before the next Annual Meeting the names of at least twenty and not more than thirty Fellows of the Association selected with due regard to geographical and Membership considerations as nominees for the Governing Council. The Executive Secretary shall publish this list to the Membership. Upon the petition of twenty-five Fellows the Nominating Committee shall add the name of any Fellow to this list provided such petition is received fifteen days before the Annual Meeting. The time for closing the polls shall be determined each year by the Executive Board. The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting shall be declared elected. Should two or more candidates receive the same number of votes the Executive Board shall, when necessary, determine by written ballot the order of precedence.

ARTICLE III EXECUTIVE BOARD

A. *Composition:* There shall be an Executive Board of ten members elected by the Governing Council, six of whom shall be members of the Governing Council, and four of whom shall be the President, the retiring President, the Treasurer, and the Chairman of the Finance Committee.

B. *The Terms* of the President, the retiring President, the Treasurer, and the Chairman of the Finance Committee as Executive Board members shall be one year each, and the terms of the other members shall be two years each, expiring in rotation, three each year. These terms shall begin at the end of the annual meeting at which elected, and shall continue until the end of the annual meeting at expiration of term, provided that newly elected members of the Board shall have the right to attend meetings as soon as elected, and shall have no vote until installed.

C. *Reëlection:* After two consecutive terms a member of the Executive Board shall be ineligible for reëlection during one Association year. This provision shall not apply to an officer of the Association.

D. *The Officers* of the Association shall be the officers of the Executive Board.

E. *Duties:* The duties of the Executive Board shall be:

1. To direct the administrative work of the Association.

2. To act as trustee of its properties.

3. To procure funds and to authorize budgets for the Association work.

4. In general to carry out the policies of the Governing Council between meetings of the latter.

F. *A Quorum* of the Executive Board shall consist of four members.

ARTICLE IV OFFICERS

The officers elected by the Governing Council shall be nominated from the floor.

ARTICLE V MEETINGS OF THE ASSOCIATION

There shall be at least one annual meeting of the Association, held at a place to be selected by the Governing Council. Special meetings of the Association may be called by a majority vote of the Governing Council, the Executive Board, or the Association.

There shall be a Central Program Committee composed of the Secretaries of the

several Sections of the Association and the President and Executive Secretary of the Association. The scientific program of meetings of the Association shall be prepared under the direction of the Central Program Committee.

ARTICLE VI SECTIONS

Sections shall elect their own officers. They shall conduct sessions in coöperation with and under the supervision of the Executive Board. The Constitution and By-laws of Sections and amendments thereto shall be submitted for the approval of the Governing Council, and shall be valid only after such approval.

ARTICLE VII PUBLICATIONS

All publications of the Association and of its Sections shall be issued under the direction of the Executive Board. The Executive Board shall appoint a Managing Editor of the official journal, who may also be the Executive Secretary of the Association. The Executive Secretary shall, with the approval of the Executive Board, appoint an Editorial Board of not less than five members, to serve at the pleasure of the Executive Board. All papers and reports for the annual meetings are to be accepted with the understanding that they shall be the property of the Association for publication, unless this right is waived by the Managing Editor.

ARTICLE VIII STANDARDS

There shall be a Council on Standards which shall be designated by the Executive Board. Any resolution, report or publication which undertakes to establish in the name of the Association or any of its Sections professional or technical standards, shall be submitted to the Council on Standards. The Council shall give notice by publication to the Membership of all proposed standards and report its approval or disapproval of such proposed standards to the Governing Council.

Proposed standards approved by a three-fourths vote of the Governing Councilors voting shall become official standards of the American Public Health Association.

ARTICLE IX FINANCES

The Executive Secretary shall receive and deposit to the account of the Treasurer all remittances sent to the Association. The Treasurer shall be custodian of investments of the Association and shall disburse funds in accordance with duly authorized vouchers. With the approval of the Executive Board he may establish a drawing account for the Executive Secretary. The Executive Secretary shall send each month to members of the Executive Board a financial summary of receipts and disbursements. Once each month, or oftener if called for, he shall also forward to the Treasurer and President an itemized statement of all expenditures. The Executive Secretary and the Treasurer shall be bonded at the expense of the Association in an amount to be determined by the Executive Board. The books of the Association shall be audited annually by certified public accountants, to be appointed by the Executive Board.

ARTICLE X COMMITTEES

Committees of the Association shall be authorized by the Governing Council or the Executive Board. The President shall appoint the members of such committees. Such appointments expire at the next annual meeting, unless otherwise specified.

ARTICLE XI AMENDMENTS

These By-laws may be amended by a majority vote of the total membership of the Governing Council during the annual meeting, provided that twenty-four hours prior written notice thereof has been given. The By-laws may further be amended by a two-thirds vote of those voting at any meeting of the Governing Council called for the purpose, provided that notice thereof shall have been given at least fifteen days prior to such meeting.

CONSTITUTION FOR SECTIONS

ARTICLE I NAME

The name of this body shall be the ..... Section of the American Public Health Association.

ARTICLE II SCOPE OR OBJECT

(To be stated briefly for each Section.)

ARTICLE III MEMBERSHIP

A. *Voting Power:* The right to hold office or to serve as the chairman of a committee shall be limited to Fellows of this Section who have been elected under the By-laws of the Association.

Members may participate in the scientific sessions of any Section and may affiliate with any one Section. They may serve on committees except as chairmen.

B. *Payment of Dues* in the Association is a prerequisite to Section Fellowship, and nonpayment of dues shall invalidate Section Fellowship and Membership.

ARTICLE IV SECTION OFFICERS

A. *The Officers* of this Section shall be a

Chairman, a Vice-Chairman, and a Secretary. These three officers shall be the representatives of the Section to the Governing Council of the Association.

B. *Terms:* New terms begin and old terms expire at the end of annual meetings. After four consecutive years in any elective Section office, except that of Secretary, a member shall be ineligible to reëlection to that office during one Association year.

C. *The Chairman* shall preside at meetings of the Section and of the Section Council, and shall be Chairman of the Committee on Program, and of the Committee to advise on Publication of Papers in the AMERICAN JOURNAL OF PUBLIC HEALTH.

D. *The Vice-Chairman* shall preside at meetings of the Section and of the Council in the absence of the Chairman, and he shall be a member of the Section Council.

E. *The Secretary* of the Section shall keep the minutes, and other records of the Section and of the Section Council; and shall transmit to the Executive Secretary of the Association a copy of the minutes of both business and scientific sessions as soon as practicable thereafter. When unable to be present at meetings, he shall thoroughly instruct a substitute as far in advance of the meeting as possible.

The Secretary of the Section shall be ex-officio a member of all Section committees.

The Section Nominating Committee shall renominate capable Section Secretaries whenever practicable, in the interest of continuity in Section work and policies.

ARTICLE V NOMINATION AND ELECTION

A. *Nominating Committee:* The Section Chairman, with the advice of the Executive Committee of the Section, shall appoint a Committee on Nominations at least fifteen days before each annual meeting. The Section Secretary shall be a member of such Committee.

The Committee on Nominations shall present, not later than the second meeting of the Section, at each annual meeting of the Association a list of nominees for the Section offices, and for membership in the Section Council; provided that if the name of any Fellow be transmitted to the Section Secretary over the signature of ten Fellows of the Section at least fifteen days in advance of an annual meeting, the Nominating Committee shall add the name of such Fellows to its own list of nominees. No nominations shall be made from the floor of the meeting. Election shall be by the Fellows of the Section.

Should the Section Chairman fail to appoint a Committee on Nomination as above provided, such a committee shall be appointed for the Section by the President of the Association.

ARTICLE VI SECTION COUNCIL

A. *Composition:* There shall be a Section Council composed of the three officers and from three to six elective members, who shall be Fellows of the Section.

B. *The Terms* of elective Councilors shall be two years each and shall expire in rotation. Terms of Councilors shall begin immediately after the annual meeting when elected; provided that Councilors shall have the right to attend meetings of the Council in an advisory capacity as soon as elected.

C. *Duties:* The duties of the Section Council shall be:

1. To act in the capacity of a board of directors for the Section.

2. To supplement the Section in authorizing the appointment of committees by the Section Chairman, and to advise in the selection of personnel.

3. To act as a Committee on Resolutions for the Section.

4. To nominate Fellows for election under the By-laws of the Association.

5. To inform the Editor of the official Journal which papers and reports presented at Section meetings merit publication.

D. *Executive Committees:* Between annual meetings, the Section officers shall act as an Executive Committee of the Section Council.

E. *Meetings:* At least one meeting of the Council must be held at the annual meeting of the Section. Interim meetings may also be called by the Section Chairman.

F. *Attendance:* Absence from two consecutive annual meetings, or failure to answer two consecutive official communications on Section business requiring reply, shall be equivalent to resignation from the Council, subject to reinstatement by the Council if good cause is furnished.

ARTICLE VII SECTION COMMITTEES

A. *Authorization:* Committees of the Section may be authorized by the Section or by the Section Council.

B. *Appointment:* Appointment of committee personnel shall, unless otherwise specified, be by the Section Chairman with the advice of the Section Council.

C. *Reports:* All scientific reports, upon presentation to the Section, shall be referred by the Chairman to the Section Council, or to a special reference committee which shall report back to the Section. The Section shall then vote on each report whether or not to adopt. In case of failure of the Section to

take definite action before the end of the annual meeting, such duty shall devolve upon the Section Council.

ARTICLE VIII PROGRAMS

A. The programs of the Sections shall be prepared by the Section Secretary in accordance with the Constitution and By-laws of the Association and the rules and standards established by the Central Program Committee.

B. *All Section Papers* and reports shall automatically become the property of the Association for publication purposes, except as this right is waived by the Managing Editor.

ARTICLE IX AMENDMENTS

Amendments to this Constitution may be made only by the Governing Council of the Association, and in the same manner as the By-laws of the Association; provided that the Section may adopt By-laws not in conflict with this Constitution.

ASSOCIATION NEWS

A. P. H. A. REPRESENTATION INVITED TO PACIFIC SCIENCE CONGRESS

The A. P. H. A. has been asked to send delegates to the Fourth Pacific Science Congress at Batavia and Bandoeng, Java, May 16–25, 1929. This congress will be held under the auspices of the Netherlands Indies Pacific Research Committee, supported by the patronage of the Netherlands Indies Government.

The executive committee of the Fourth Congress has planned the organization of the Congress by four divisions including: Physical Sciences, Biological Sciences and Agricultural Sciences.

DR. GEIGER RAILROAD CONSULTANT

J. C. Geiger, M.D., associate professor of epidemiology, University of California Medical School, San Francisco, Calif., has been appointed through the university as epidemiologist and consultant in public health and hygiene for the Southern Pacific Railroad System. Dr. Geiger has recently made an investigation of tularemia along the railroad's lines in Nevada. He is a Fellow of the A. P. H. A. and is a member of the section council of the Food, Drugs and Nutrition Section of the Association.

DR. CLARENCE O. SAPPINGTON GOES WITH NATIONAL SAFETY COUNCIL

Clarence O. Sappington, M.D., a member of the A. P. H. A. and a frequent contributor to the AMERICAN JOURNAL OF PUBLIC HEALTH AND THE NATION'S HEALTH, has been appointed the first director of the newly created division of industrial health of the National Safety Council, Chicago, Ill.

MR. SHERE GOES TO COMMERCIAL FIRM

Lewis Shere, a member of the Public Health Engineering Section, and a frequent contributor to the JOURNAL, has been granted a year's leave of absence from the Chicago Health Department, where he has been director of the City Division of Dairy Products, to become Director of Research and Publicity of the Diversey Manufacturing Company, Chicago, Ill.

DR. PATTERSON ON STAFF OF JOHN HANCOCK LIFE INSURANCE COMPANY

Raymond S. Patterson, Ph.D., Fellow of the A. P. H. A., formerly with the New Jersey State Department of Health, has been appointed director of health education of the Life Conservation Service of the John Hancock Mutual

Life Insurance Company, Boston, Mass. Dr. Patterson is editor of the Selected Public Health Bibliography published monthly in the *American Journal of Public Health and The Nation's Health*, and has been active in the Public Health Education Section of the Association.

DR. DAVIS WITH ROSENWALD FUND

Michael M. Davis, Ph.D., a Fellow of the A. P. H. A., and chairman of the sub-committee on Organized Care of the Sick of the Committee on Administrative Practice of the Association, has been appointed to the executive staff of the Julius Rosenwald Fund as director for Medical Services. Although Dr. Davis will be permanently located in Chicago, he will continue his close cooperation with the Committee on Administrative Practice. Dr. Davis will direct the program which the Julius Rosenwald Fund is planning to undertake in improving the organized facilities for medical service to the average man of moderate means.

NEW MEMBERS

Alice C. Bagley, R.N., San Francisco, Calif., Assistant Superintendent of Nursing, Metropolitan Life Insurance Company

Charles W. Bergquist, Chicago, Ill., President Chicago Tuberculosis Institute

Shaoch'ing Hsipo Ch'uan, M.D., Tientsin, China, Health Commissioner (Assoc.)

Bertha C. Clow, M.S., Madison, Wis., Instructor and Research Worker in Home Economics Department, University of Wisconsin

Winifred Colvin, R.N., Chicago, Ill., Public Health Nursing

Mary T. Dowling, R.N., New York, N. Y., Industrial Nurse with Press Publishing Company

Neil S. Dungay, Ph.D., M.D., Northfield, Minn., Professor of Hygiene and Public Health and Director of Health Service, Carleton College

George Hay, M.D., Johnstown, Pa., Former Health Officer and City Physician

Jacob J. Hood, M.D., Cicero, Ill., Health Commissioner

Letta Jones, R.N., Chicago, Ill., Public Health Nursing

Henry F. Juengst, C.E., St. Joseph, Mo., Bacteriologist and Civil Engineer, St. Joseph Water Company

Stuart K. Knox, Montclair, N. J., Consulting Hydraulic and Sanitary Engineer

Carl J. Lauter, Washington, D. C., Chief Chemist, Washington, D. C., Water Supply

Charles H. Mayo, M.D., D.P.H., Rochester, Minn., Health Officer

Marion McKinney, B.A., M.S., White Plains, N. Y., Statistician, Health Department

Esther H. Oyhus, Chicago, Ill., Teacher of Oral Hygiene in Public Schools

Ivan C. Peterson, Chicago, Ill., Municipal Engineer

Margaret Reid, B.S., R.N., Indianapolis, Ind., Nursing Field Representative, National American Red Cross of Washington, D. C.

Alphonse M. Schwitalla, A.M., Ph.D., St. Louis, Mo., Dean, School of Medicine, St. Louis University

Roy Schneiter, M.S., Rouses Point, N. Y., Junior Bacteriologist, Food, Drug and Insecticide Adm., U. S. Department of Agriculture

T. B. Sims, Cleburne, Tex., Superintendent Water and Sewer System

Charles F. Tambling, M.A., Mt. Pleasant, Mich., with Department of Anatomy, Physiology and Physical Education, Central State Teachers College

Frank R. Theroux, M.C.E., Chicago, Ill., Sanitary Engineer

George H. Wandel, D.D.S., Riverside, Ill., Supervisor Bureau of Dental Health Education, American Dental Association

Marion Yang, M.D., Peiping, China, Instructor in Hygiene and Public Health, Peking Union Medical College, Chief, Division of Medical Service, First Special Health Area (Assoc.)

P. J. Alwin Zeller, College Station, Tex., Sewage Research, Texas Engineering Experiment Station

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D.P.H.

Microbic Dissemination in Schools—After many years of experience the general consensus of opinion is that the isolation of infectious disease has in itself been of no material effect in reducing the morbidity as a whole, irrespective of any influence on age distribution or severity of infection.

The carrier and the individual with sub-clinical infection aggravate the situation. It has been found that in the London County Council Schools 2 per cent of the pupils are diphtheria carriers. It is estimated that the average carrier state remains for about 3 weeks. Therefore the number of carriers in the population as a whole changes 17 times during the year, and with a 2 per cent infection rate there would be 34 per cent of the population infected as carriers during the year. On the other hand, it was found that only 1 per cent of the population was infected with clinical diphtheria and therefore the carriers were over 30 times as numerous as cases in the London County Council Schools.

At the present time little impression can be made on the incidence of the minor droplet infections by attempts to isolate the distributors of them or increase the immunity of their receivers by means of a vaccine. A certain minimum number of bacteria are necessary in order to break down the natural immune defenses of man or animal. The time necessary to contract infection is the minimal infective dose divided by the difference between the rates at which infective material is received and destroyed. This differential rate may be called the velocity of infection.

At the Greenwich Hospital School there were no cases of diphtheria and scarlet fever among the day boys, while 300 infections occurred among the residents. This may be attributed to the more intimate and more extended personal contact in the dormitories.

Atmospheres which support droplets containing specific pathogenic bacteria act as vaccines and increase the resistance to disease of those who breathe them. The occasional immunity to measles among those giving no history of the disease may be explained on the theory that group or herd immunity to the minor respiratory diseases is increased through previous bacterial experience.

Among the pupils of the average London day school during the first 10 years of life, 40 per cent of the susceptibles will acquire immunity by autovaccination while 10 per cent will have succumbed to clinical diphtheria. In the residential or boarding school, such as the Greenwich Hospital School, double the number will have become immune within 3 years by autovaccination, but at a cost of 1 clinical case for every 3 immunized. This means of securing immunity may be compared to active immunization which within 6 months will protect approximately 90 per cent of the susceptible group.

As a means of curtailing the spread of communicable diseases by droplet infection more space should be given to individuals who sleep in dormitories and there should be an increased allotment of linear area available in schoolrooms. The small boy, being more susceptible and having received to a less degree the advantages of autovaccination, requires more space than the large boy. Efficient ventilation decreases the possibi-

ity of infection since a good flush of fresh air acts in two ways: first, it sweeps out the infected droplets, and, second, it prevents the humidity of the air from being raised by the water continually added to it from the lungs and skins of the occupants of the room. Mechanical ventilation has done much to prevent the spread of respiratory infection in the crowded sleeping quarters which, by force of circumstances, must be used on board ship. The danger to the group or herd exists, however, when one interferes with the process of nature which has resulted in the gradual autovaccination of large numbers with the resulting group immunity.—Sheldon F. Dudley, Microbic Dissemination in Schools, *Lancet*, 17: 849 (Oct. 27), 1928.

Diphtheria Prevention in Detroit—Prior to November 1, 1928, there occurred 1485 cases of diphtheria and 179 deaths in Detroit. Of these 179 deaths, 161, or 90 per cent, occurred among children under 10 years of age. Although the number of cases is not unusual, the number of deaths is particularly high. Furthermore all of these deaths are preventable and therefore the Health Department has renewed its campaign to secure the immunization of small children against diphtheria with toxin-antitoxin. Only toxin-antitoxin in goat serum is being used this year. This is to avoid sensitization to horse serum.

Prior to the current year 61,000 Detroit children between the ages of 6 months and 5 years had been protected against diphtheria. This represents 49 per cent of this age group. There remain 64,000 to be immunized. In addition to this 65 per cent of the primary school population has previously been immunized.

In previous years the Health Department has maintained infant welfare, school and special clinics at which immunization could be secured without charge. Various means have been used to advertise the clinics, including paid newspaper advertisements, press stories, posters, bill-board advertising, moving pictures, lectures, etc. The Metropolitan Life Insurance Company agents have been especially helpful in making home contacts, and reference slips were issued admitting children to the free clinics.

This year all free clinics have been abandoned. The usual advertising propaganda is being employed but all of the toxin-antitoxin will be given by private physicians. It is estimated that approximately 1,500 physicians are actively engaged in medical practice and each office becomes an immunization clinic. Any who can afford to pay will be expected to do so. The County Medical Society is suggesting a uniform charge of $1.00 for each immunization. The toxin-antitoxin is furnished by the Health Department. If the individual is without means, the physician, by arrangement, does the work and the Health Department pays $1.50 for each 3 doses of toxin-antitoxin.

This program has been worked out jointly by the Wayne County Medical Society and the Department of Health. There has been some adverse comment in one of the local papers but this publicity has had the good effect of impressing the public with the need for immunization.

Toxin-antitoxin is available at 8 established stations. A record is kept at each station of the amount of material taken by the physician and these reports are collected by the Health Department each evening. With the toxin-antitoxin the physician takes a postcard on which he reports each c.c. used, giving the name, address and age of the child and indicating whether it is the first, second or third dose. A similar card is used for the Schick test. Each physician hangs a poster furnished

by the Health Department in his waiting room recommending toxin-antitoxin for young children.

During the first 8 days of the campaign 1,200 postcards have been received by the Health Department indicating that over 1,000 children have commenced their series of toxin-antitoxin. It is anticipated that with the present plan more preschool children will be reached as the physician's office, which becomes a clinic, is more accessible to the population as a whole. Furthermore, there will be developed a certain consciousness among the physicians of the need of practicing preventive as well as curative medicine. The results may not be so immediately startling as those obtained under the free clinic plan, but ultimately the new procedure should be productive of more widespread interest in preventive medicine.—*Weekly Health Reviews*, Detroit Dept. of Health.

Health Work in Flood Area—Following the emergency establishment of sanitary control of the flood area in the Mississippi Valley in the spring of 1927, plans were developed for the formation of full-time local health service in more than 100 counties. Funds were raised by appropriations from the flood states, the counties, the U. S. Public Health Service and the Rockefeller Foundation. A training school was established at Indianola, Miss., where 235 health workers had received instruction prior to May 1, 1928.

An analysis has been made of the trend of disease incidence in the flood area before and after the flood occurred. Smallpox morbidity has shown marked reduction in 41 counties of the flooded area of Kentucky and Louisiana. In 55 counties in the same states the death rate for malaria has been decreased over a period of 10 years. Pellagra, which has been on the decrease in Kentucky for over 8 years, showed an increase in 1926 and 1927 while in Louisiana the death rate from pellagra has been constant for the 10-year period. The death rates for typhoid, infantile diarrhea and diphtheria for 1927 in the 55 flooded counties of Kentucky and Louisiana did not show any marked variation from the trend for the past 10 years.—C. N. Leach, Progress of Health Work in the Mississippi Flood Area, *J. A. M. A.*, 91: 1595 (Nov. 24), 1928.

Poliomyelitis After-care—The last legislative assembly in California passed an act requiring the State Health Department to provide such services as transportation, materials or appliances as are needed for the treatment of indigent children who have suffered from infantile paralysis. The cost including hospitalization and clinic service is chargeable to the county in which a child resides, the expense of administration being the only financial obligation of the State Health Department. In the year 1927 there were 1274 cases of poliomyelitis in California, of which 812 showed paralysis in one or more muscle groups; 205 were abortive; and 257 were of a type that has not as yet been determined.

The average cost per patient hospitalized under the terms of the recent act amounts to $1,000. The cost has been kept within this amount by a special hospital rate of $4.00 a day and a special operating fee made to the department of health by the orthopedic surgeons. The existing law has not been entirely satisfactory in view of the fact that the financial burden is too severe for some of the counties. It is suggested that some plan be evolved whereby the county pays one-third, the state one-third and some local welfare organization the other third.—W. M. Dickie, The After-care of Poliomyelitis, *J. A. M. A.*, 91: 1417 (Nov. 10), 1928.

LABORATORY

C. C. YOUNG

THE NEWMAN COMBINED FAT EXTRACTION, FIXING AND STAINING SOLUTION FOR USE IN THE DIRECT MICROSCOPIC TECHNIC FOR COUNTING BACTERIA IN MILK

ROBERT S. BREED, Ph. D., FELLOW A. P. H. A.

New York Agricultural Experiment Station, Geneva, N. Y.

IN the January, 1927, number of the *Monthly Bulletin* of the California State Department of Agriculture,* R. W. Newman, bacteriologist for the Dairy Laboratory of the Division of Chemistry of the California department, has been given three formulas that simplify the staining procedure for the direct microscopic technic for counting bacteria in milk. The author does not indicate which solution he prefers, so that many inquiries are being made in regard to the use of these solutions.

After several laboratories, including our own, had tried them out and found that the solutions were satisfactory for the purpose recommended, a footnote referring to them was inserted (p. 23) in the reprinted Fifth Edition of the *Standard Methods of Milk Analysis*† of the American Public Health Association. However, the formulas for the solutions were not given, so this has led to many further inquiries. After several months of experience in our own laboratory where we had found Formula No. 2 to be the most satisfactory, the author of this note wrote to Mr. Newman for a statement in regard to his experience and learns that he too regards No. 2 solution as superior to the others.

His letter reads:

> Of the three solutions, we are using and prefer Formula No. 2. We prefer this solution for two reasons: (1) because of the saving in time in the field as contrasted with Formula No. 1, and (2) because of the added "life" of the solution. Because methylene blue is so soluble in tetrachlorethane, the dye remains in solution even though the alcohol does evaporate. In Formula No. 1, on the contrary, the dye is not soluble in the xylene, and consequently is precipitated out of the solution as the alcohol evaporates. We found that the effective "life" of Solution No. 1 under field conditions was about 5 to 6 months. Solution No. 2 seems to give more satisfactory results in this respect as it does not seem to deteriorate with age. Solution No. 2 has been used exclusively by the inspectors of this department in grading milk in this state for the past two years.

Two persons have reported difficulty with Formula No. 3, apparently caused by impurities in the pyridine which dissolve the dried milk solids. Mr. Newman reports that a shipping clerk in the Eastman Kodak Company once misread a label and sent him tetrachlorethylene in place of tetrachlorethane. Mr. Newman also reports that in order to secure deeper staining he now adds 1.12 gm. of methylene blue per 100 c.c. in place of the 1.00 gm. originally recommended in Formula No. 2. This, however, appears to be a matter of personal pref-

* Also in *Proc. Soc. Exper. Biol. & Med.*, 24: 323–325, 1927.

† Obtainable from the Association, 370 Seventh Avenue, New York, N. Y. Price $.50.

erence as we have had no difficulty in using stains made up with the original formula. The formula recommended is as follows:

FORMULA NO. 2

Methylene blue powder, certified..	1–1.12 gm.
Ethyl alcohol, 95 per cent.....	54 c.c.
Tetrachlorethane, technical *.....	40 c.c.
Acetic acid, glacial.....	6 c.c.

Add alcohol to the tetrachlorethane in a flask and heat to a temperature not to exceed 70° C. (if it is desired to use methyl alcohol, the temperature should not be raised to more than 55–60° C.). Add the combined solution to the powdered methylene blue. Shake vigorously until the dye is completely dissolved. The original directions state that the glacial acetic acid should be added at this point, but Mr. Newman writes that it is better to *cool* the solution before adding acid and that the acid should be added *very slowly*. Further heating of the acid solution should be avoided. Filter and keep in a tightly stoppered bottle.

DIRECTIONS FOR USE

1. Prepare the milk smear.
2. When dry, immerse the smear in the solution and withdraw immediately.
3. Drain until dry (30 seconds).
4. Wash in water.
5. Dry and observe.

This solution permits much more rapid staining than does No. 1 and yields a clear, well stained preparation. The smears readily wash off the slide unless they are dried before washing (Step No. 3). If dried too rapidly the smears present a spongy appearance. If the smears are dipped in 70 per cent alcohol, this trouble may be prevented.

At this time it might be well to mention a simplification of the method of taking samples and preparing the slides that is entirely permissible where the counts obtained are to be used in educational work only, or where preliminary results are used as a means of finding milk supplies that need more careful examination later. In these cases, samples may be dipped from the weigh-vat with a dipper that is thoroughly rinsed in the milk that is to be sampled. The 0.01 c.c. pipette is then inserted directly into this dipper and this amount of milk withdrawn. The smear is spread immediately on a slide and placed on a suitable warm and level drying plate. Satisfactory drying plates are readily made by placing an electric bulb in a tin box. In the majority of milk plants, connections can be made to some electric light fixture with a suitable extension cord.

An experienced worker can prepare slides in this way with samples from each patron almost as rapidly as the milk is dumped and weighed. Ordinarily it is possible to stain the slides in spare moments so that the slides are ready for examination by the time all of the milk has been brought to the plant (usually 9 to 10 A.M.). Thus it is quite possible to examine an average of 200 samples of milk per day with a great saving in the preparation of sample bottles, provision for icing samples and transportation to a suitable place for making the slides. A single worker using this simplified technic has collected and examined as many as 350 samples in one day.

* Obtainable from Eastman Kodak Co. Technical tetrachlorethane is relatively inexpensive.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Nineteen Twenty-eight a Good Health Year—General health conditions in the United States and Canada have been more than satisfactory during the first 9 months of 1928. In only two prior years, 1927 and 1921, has this year's health record, for any January–September period, been excelled. This is clearly indicated by the mortality record of more than 18,500,000 persons—the industrial policy holders of the Metropolitan Life Insurance Company, who comprise more than one-seventh of the combined population of the two countries. The death rate among approximately 16,000,000 white insured persons, this year, was 8.3 per 1,000. This closely approaches the minimum figures of 8.2, as recorded for the first 9 months of both 1927 and 1921. The rate for approximately 2,500,000 colored persons was 15.5 per 1,000, one of the most favorable mortality figures ever recorded for this large group of insured colored people.

The most important item in this year's health record is the continued drop in the tuberculosis death rate among the white industrial population. It is now entirely safe to announce that the end of 1928 will see the lowest mortality figure ever recorded for tuberculosis in the United States and Canada. Another extremely gratifying development this year is the indication that 1928 will very probably register the lowest death rate for puerperal diseases ever recorded among women in the industrial population. Here both white and colored insured women have shared in the gains. Still another disease, typhoid fever, seems destined to show, in 1928, a lower mortality figure than ever before. With the exception of measles, the four principal communicable diseases of children are causing fewer deaths than in 1927; and even with measles the death rate is well below the average. The improvement in the diphtheria situation is particularly gratifying. Last year the mortality from this disease rose somewhat, after showing a continuous decline over a series of years. Developments in 1928 indicate, however, that the 1927 rise was only a temporarily unfavorable phase of a generally improving situation. Influenza and pneumonia have caused more deaths than last year, but not more than the average. Alcoholism caused 434 deaths during this 9 months' period as compared with 427 during the corresponding months of 1927. The 9 months' mortality record for the external causes of death shows improvement over that made during the similar months of 1927. Deaths due to automobile accidents are still increasing among the colored, but, for the first time in the records of the company, the automobile fatality rate among white persons is lower than in the preceding corresponding period.—*Stat. Bull.*, Met. Life Ins. Co., 10: 1–5 (Oct.), 1928.

The Malaria Record of 1927—The incidence of malaria is very much localized in particular areas, chiefly those that still suffer from defective drainage. The malaria death rate in the registration area for 1926 was 1.9 per 100,000 population, and for 1925, 2.1 per 100,000. The data from 26 cities, chiefly in the South, show that the death rate has declined from 3.9 per 100,000 in 1923 to 2.0 in 1927. In 1923 the

highest death rates in this group were 22.0 for Shreveport, La., and 15.1 for Tampa, Fla. In 1924 Shreveport again ranked highest with a death rate of 14.2 per 100,000. Augusta, Ga., had a rate of 11.0, and Memphis, Tenn., a death rate of 9.9. In 1925 the highest rate was reported for Augusta, Ga., with 10.9 per 100,000. In 1926 the highest rate was 11.8 for Shreveport, La., followed by Memphis, Tenn., with a rate of 11.3, and Augusta, Ga., with a death rate of 10.8 per 100,000. The highest death rates in 1927 were 10.7 for Augusta, Ga., and 10.5 for Montgomery, Ala. Jackson, Miss., not in the group of 26 cities, reported a malaria death rate of 20.8, which is one of the highest on record for recent years.

In Europe special efforts for malaria eradication are being made by the Health Section of the League of Nations. In Lithuania the number of malaria cases declined from 268 in 1922 to 51 in 1926. In the region of Galatz, Roumania, the number of cases was reduced from 49,896 in 1924 to 20,176 in 1926 as the result of sanitary measures. In the territory of Soviet Russia there was a reduction of about 860,000 cases between 1924 and 1925, and a reduction of 670,000 cases between 1925 and 1926.—Frederick L. Hoffman, *Spectator*, 121: 35–36, 38 (Nov. 15), 1928.

Scottish Vital Statistics, 1927—The seventy-third annual report of the Registrar-General for Scotland records the estimated population of Scotland in the middle of 1927 as being 4,891,953. The deaths registered during the year numbered 65,830, and the death rate was 13.5 per 1,000 population. The deaths for the year were 2,050 more than in 1926. The births for 1927 numbered 96,672 with a birth rate of 19.8 per 1,000. The birth rate for the year is 1.2 less than that of the previous year, and 2.3 less than the mean of the preceding five years. It is the lowest Scottish birth rate yet recorded, the previous lowest being 20.3 in 1917. Subsequent to the termination of the World War, the Scottish birth rate rose and attained a maximum of 28.1 per 1,000 in 1920, but it has since then steadily decreased.

In 1927 the death rate from malignant disease was 141 per 100,000 population. In 1926 it was 136 and averaged 132 for the preceding 5 years. The total death rate for tuberculosis was 100 per 100,000 population, while from tuberculosis of the respiratory system it was 71 per 100,000. There was a death rate of 6.4 per 1,000 registered births for diseases and accidents of pregnancy and parturition. There were 152 deaths by coal gas poisoning for the year and 448 from motor car accidents.

A relatively small proportion of children born in 1926 were reported to have been successfully vaccinated. Of the 36,376 unvaccinated children, 30,804 were exempted from vaccination because of conscientious objection on the part of their parents.—*Med. Off.*, 40: 158 (Oct. 13), 1928.

Public Health in Western Samoa—The population of Western Samoa was 42,865 on December 31, 1927. It consisted of 39,215 Samoans, 2,564 Europeans, 939 Chinese laborers and 147 Melanesian laborers. The births of 1,636 living children were registered during 1927, giving a birth rate of 42.4 per 1,000 of the native population. The deaths numbered 495, giving a death rate of 12.8. The increase of the population was 29.6 per 1,000, and this is far in excess of the natural increase of any European country. In 1926 there was a birth rate of 52.6 and in 1925, 56.3. The death rates for 1926 and 1925 were 19.4 and 23.8 respectively. The decrease in mortality is probably due to a reduction of epidemic disease. In 1925 there was an

epidemic of whooping cough which caused over 200 deaths. In 1926, 53 deaths were due to an outbreak of dysentery and 25 were attributed to an influenza epidemic. In 1927 there was no epidemic disease. The infant mortality rate was 101 per 1,000 live births in 1927, 106 in 1926, 186 in 1925 and 153 in 1924.

There were 46 cases of lobar and 8 of bronchial pneumonia treated in the hospital. There were 9 pulmonary, 2 peritoneal and 6 meningeal tuberculosis cases treated. Three cases of puerperal septicemia and 23 cases of enteric fever were treated. More and more cases of cancer among Samoans are coming to light. Fourteen cases, of which 7 were carcinoma of the stomach, 3 of the intestines and 2 of the uterus, were treated during the year. An extensive campaign against hookworm and yaws commenced in 1923. Treatment was given for 606 cases of hookworm during 1927, and no bad cases were found. The total number of N. A. B. injections against yaws was 7,450.—Public Health in the Mandated Territory of Western Samoa, *League of Nations Epidemiological Report*, Oct. 15, 1928, pp. 379–380.

Medical Conditions in the South Pacific—The infant mortality in the islands of the South Pacific is very high, being estimated previous to 1922 at 200 to 300 per 1,000 births. In 1923 there was an infant mortality rate of 167 per 1,000 births in Fiji, a rate of 136 in Tonga and 200 in Western Samoa. General health measures had reduced the rates by 1926 to 155 for Fiji, 102 for Tonga and 106 for Western Samoa, although an epidemic of whooping cough in 1925 caused the abnormally high infant mortality rates of 172, 295 and 186 per 1,000 births in the three respective districts. Modern principles of medicine maintained the birth rate in Western Samoa at over 50 and reduced the death rate to under 20 between 1923 and 1927.

Yaws is common among the people of the Pacific Islands, and was a great problem until the recent introduction of arsenicals for treatment. Syphilis is rare seemingly because of the prevalence of yaws. Leprosy is common and spreading in the New Hebrides, but is not so prevalent in the Solomon Islands and New Guinea. Vaccination against smallpox is given in the ports of Papua and New Guinea. Fiji vaccinates a few thousand each year, but otherwise native populations are protected only by quarantine at ports of entry. Measles is now endemic in Fiji, Samoa, Tonga, the Cook Islands and the New Hebrides, and diphtheria occurs in a mild form in many of the islands. Tuberculosis is the immediate cause of more deaths than any other disease in the Pacific. The commonest form in which it appears is pulmonary tuberculosis. Glandular and peritoneal tuberculosis are less common and bone infections are rare. There have been epidemics of influenza in the islands for over one hundred years. In 1918 from 10 per cent to 20 per cent of the various native groups died from influenza. Typhoid fever occurs in a mild form in Melanesia but in Fiji, Tonga and the Cook Islands it is at times endemic or epidemic. The control of malaria is one of the most difficult problems in the islands, and in such countries as Papua, New Guinea, the Solomon Islands and the New Hebrides would be an impossible expense. The whole southern coast of Papua is malarious although this condition diminishes in the Delta Region of Western Papua. Samoa and Tonga are the most forward of the groups in sanitation and water supply, but in most of the villages very primitive conditions exist.—S. M. Lambert, *M. J. Australia*, 2: 362–378 (Sept. 22), 1928.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

DISCUSSION OF "SANITATION OF WATERSHEDS"*

Warren J. Scott, Director, Bureau of Sanitary Engineering, Connecticut State Dept. of Health, Hartford, Conn.—Possibly it is because I too am from New England that I agree with Mr. Chase's discussion in that it advises that caution should be exercised in the modification of the old New England policy of reliance upon clean watersheds and storage for water supplies relatively free from pollution.

It seems to me that the committee † of this Association referred to by Mr. Chase has gone rather far in its emphasis on the remoteness of the dangers of bathing in public water supplies and of other recreational uses. It is difficult for a committee to generalize on policies which must of necessity vary for different sections of the country. I do not blame the committee for recognizing that the limitation of the recreational use of watersheds must be on a reasonable basis.

It is true that public opinion, in the face of too strict standards, may force a complete about-face and let down the bars too far. In some cases, the derivation of a small water supply from a large watershed under too strict regulation may work a hardship on a far greater number of persons than are benefited. The reverse is usually true in Connecticut. Another consideration is the taking of watersheds that are now used for purposes of recreation for additional water supply purposes.

On the other hand, advocacy of the relaxation of present standards for clean watersheds as practiced in New England and elsewhere should certainly not emanate from public health authorities or public health associations.

In most of New England, the statute law with regard to bathing, fishing, and other recreational uses, appears to be based upon the fact that to drink the water or to secure it uncontaminated is the primary right. Bathing and other recreational uses which pollute the water are considered as a secondary right which may be taken away as a matter of public policy.

Looking at the question of recreational use of water supplies solely from the standpoint of health, what happens if water supplies now dependent only upon clean watersheds and some storage are opened for unrestricted recreation? It may be said that the community using the water will have to install treatment. If treatment is adopted and properly supervised, the health hazard may be less than formerly. Treatment, of course, is always desirable as an additional form of protection. But would treatment be installed in many cases? and if so, what would the type of treatment be? In many of our small New England communities using small gravity supplies with widely varying rates of consumption, chlorination is difficult and unreliable unless it is possible to install an equalizing reservoir. The latter may be comparatively expensive for a small

* In the November, 1928, issue of the JOURNAL, there appeared a paper by E. Sherman Chase on Sanitation of Watersheds. Viewpoints of others on the same question, while not always in agreement, usually are enlightening. Hence, two discussions of Mr. Chase's paper are presented here.

† Committee on Water Supplies.

community, and this might also be true of filtration. Even if treatment were installed on a small water supply, it might be poorly supervised, with resultant danger. The answer then, from the standpoint of the health worker, is that the community is likely to face another distinct health hazard which does not now exist. And yet the benefits from the recreational standpoint may be slight.

It is possible that public opinion may eventually bring about a modification of our present New England policies, and if so, the problems attendant on such modification will have to be met. Possibly the use of a new water supply which takes away existing benefits of recreational use should be accompanied by suitable treatment to avoid the loss of these benefits. Additional treatment works and land purchases may be required to an increasing degree to overcome the dangers from less stringent watershed regulations. But as public health workers, it seems to me that we should work toward making any changes gradually. We should not belittle the very real dangers of recreational use of water supplies any more than we should close our eyes against the need for a reasonable public policy. Any modification of existing policies should be made with due regard to the local conditions and after due consideration of the hazards created and the practicability of adoption of means of combating them as well as the recreational benefits to be derived.

H. E. Moses, Asst. Chief Engineer, Pennsylvania State Dept. of Health, Harrisburg, Pa.—Properly the author confines the subject to the sparsely settled watershed, where control measures have a reasonable chance of being effective. Here two main problems must be dealt with; namely, those relating to:

1. The permanent population on the shed
2. The transient population on the shed

With respect to the first, state laws and regulations, where adequate, permit health departments to enforce sanitation measures. These will be effective in so far as they are practicable and as the laws are wisely administered. But the real problem—and the growing one—has to do with the transient population passing over the watershed. We may have uninhabited watersheds but the unvisited catchment area is fast becoming a rarity.

Possibly the most pressing need relates to the hazard created by the recreational use of watersheds. This includes camping, hunting, fishing and bathing. These practices raise real problems for the water works officials and the health authorities. Fishermen are insisting on their so-called inherent right to use not only the streams but also the reservoirs for fishing purposes. Camps and colonies on watersheds are rapidly increasing, and swimming and bathing are growing in popularity.

Akin to this phase of the question is the matter of riparian ownership of land abutting on water used as a source of public water supply. It is understood that such riparian owner has an inherent right to the reasonable use of the stream, including bathing, for himself, his family, servants, and invited guests. This probably holds so long as the riparian owner does not commercialize this use of the stream.

The solution of the problem must be reasonable and practicable and at the same time not serve to arouse such antagonism as to result in adverse legislation. A good example of the extremes to which a legislature may go when sufficiently urged by the people is the New Jersey case where in 1927 the Legislature passed an act which was vetoed by the governor, repassed over his veto, and is now a law. This statute reads: "It shall be lawful to bathe or swim in any of the fresh waters

of this state, provided that in so doing no trespass be committed. This act shall take effect immediately." This case probably represents an extreme measure but is cited to show a tendency in that direction.

In an attempt to find some measuring stick of more or less general application these two general principles are suggested:

First, where the reservoir does not have a nominal long-time storage and where ways and means have not been installed or are not being operated to safeguard the sanitary quality of the water delivered to the consumers and where the catchment area is relatively uninhabited and untraversed by much traveled highways, the recreational use of the catchment area does constitute a menace to the public health.

Second, where the nominal retention of the water in the reservoir can be construed as adequate long-time storage, and where ways and means have been installed and are being operated to safeguard the sanitary quality of the water delivered to the consumers, and the catchment area is inhabited or traversed by extensively used highways, the recreational use of such a catchment area does not constitute a menace to the public health because the persons so using these areas do not add an undue burden upon the self-purification to be obtained from the assured long-time storage and from the artificial ways and means which have been installed and are being operated to safeguard the sanitary quality of the water delivered to the consumers. Hence, in such cases, consideration might be given to permitting the public a restricted use of the watershed area, exclusive of the reservoir and the margins thereof.

Certain protective measures, some of which have been mentioned by Mr. Chase, merit brief discussion:

1. Ownership of Watershed—This is basically an economic problem and must be determined by the respective merits of ownership versus protective measures and purification. Its effectiveness is dependent on the extent of watershed control and grows less practical as the size of the watershed increases. Where it owns the watershed, the water company can invoke trespass laws. Certainly the reservoir site and the shore margins should be owned or definitely under the control of the water company.

2. Zoning—This practice is not applicable except on company controlled or state owned land. Elsewhere private ownership prevents.

3. Placarding—This is practical on small areas. Its effectiveness is uncertain but it is probably beneficial.

4. Sanitary Control—Within rather circumscribed limits, it can be administered under existing laws, health regulations and with available personnel.

5. Education of Public—Undoubtedly this is of value, but it must be persistent and continued. It will not control the careless or vicious.

6. Legislation—This must be reasonable, capable of enforcement, with sufficient elasticity to be applicable to the varying conditions encountered. If it is too drastic, it is difficult of enforcement and arouses militant opposition, possibly defeating its purpose, which may be entirely proper.

But after all, must not these be considered as palliatives, and, valuable as they may be, as not solving the problem completely.

We in Pennsylvania have come to believe that no surface supply, valuable as may be the sanitation measures on the watershed—and they are needed—is safe without at least chlorination. This is heresy, perhaps, but nevertheless our profound conviction.

Sewage Agitation and Chlorination Tests at Havre, Mont.—During the summer months the Milk River, on which Havre is located, has not suffi-

cient flow adequately to oxidize the city's sewage. An agitation and chlorination plant was established at the outlet of one of three main sewer outlets with the following results:

Agitation reduced suspended solids from 0.882 per cent to 0.102 per cent, a reduction of 88 per cent; no marked difference was noted in the amount of settleable solids before and after agitation. With agitation only, there was an average reduction of hydrogen sulphide of 26.5 per cent (from 4.08 to 3 p.p.m.); agitation combined with chlorination gave an average reduction of hydrogen sulphide of 63 per cent; bacterial reductions were great; chlorine residual after 10 minutes was maintained between 0.5 and 1.0 p.p.m.; cost of operating plant one month was estimated at $110. This plant treated about 0.122 m.g.d.—Emil Sandquist and H. B. Foote, *Eng. News-Rec.*, 26, 100: 1001–1002 (June), 1928. Abstr. R. J. Faust.

Treatment of Tomato Cannery Wastes—Experiments conducted by the Bureau of Sanitary Engineering of the Maryland State Health Department at a tomato canning factory indicated that the liquid wastes could be clarified by precipitation with 6 gm. of lime and 4 gm. of ferrous sulphate per gal., or by absolutely quiescent sedimentation for 18 to 24 hours without the use of precipitants.—Anon., *Pub. Works*, 2, 59: 65 (Feb.), 1928. Abstr. D. E. Kepner.

Experiences with Covered and Open Reservoirs—Three years' bacterial, microscopic and chemical tests on an open and a closed reservoir in the city of Washington, D. C., both receiving the same supply from the slow sand filtration plant, chlorination then being intermittent, showed the following:

Average bacteria count 4 for filtered water, 7.6 for the covered reservoir, an increase of only 90 per cent, compared with 44 for the open basin, an increase of 1,000 per cent. There was no growth of microörganisms in the covered reservoir, whereas it was abundant in the open. Albuminoid ammonia, nitrate and nitrate tests also all showed much better conditions in the covered basin at all times.—Carl J. Lauter, *Eng. News-Rec.*, 25, 100: 963–964 (June), 1928. Abstr. R. J. Faust.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., AND LEONARD GREENBURG, PH. D.

Special Bibliographies Available—Those who are interested in the bibliographies prepared by the below mentioned committees, which bibliographies are too extensive to be included with the published reports of the respective committees, may obtain the same by addressing the chairmen of the committees in question, or the secretary of the Industrial Hygiene Section, Carey P. McCord, M.D. (Industrial Conservancy Laboratories, 34 W. 7th St., Cincinnati, Ohio). Bibliographies cover recent years:

Industrial Fatigue and Allied Subjects, Eugene L. Fisk, Chairman of Committee, c/o Life Extension Institute, 25 W. 43d St., New York, N. Y.

Lead Poisoning in the United States, Carey P. McCord, Chairman of Committee (see address above).

Skin Irritants, Henry Field Smyth, Chairman of Committee, Laboratory of Hygiene, University of Pennsylvania, Philadelphia, Pa.

The Compensation Law and Its Application to Lead Cases—The New York law schedules 19 occupational diseases subject to compensation, and defines disability as "the state of being disabled from earning full wages at which the employe was last employed." Occupational disease disablement is treated as an accident with the right to compensate within 12 months of contraction. Presumption as to the cause of an occupational disease is deemed acceptable if the exposure has been to one of the processes mentioned in the second column of the schedules of diseases. The term "lead poisoning" lacks a standard definition of general acceptance. Some will not diagnose a case of lead poisoning unless colic is present; still others only when the presence of stippled cells is noted, etc. Due to this confusion it has been put forward from the standpoint solely of medical terminology that this term be arbitrarily and definitely confined only to the toxic episodes, namely, colic, lead palsy, or encephalopathy; and that "lead absorption" be used to cover all other cases of lead which has been absorbed into the body. Considered from this point of view "lead poisoning" becomes a subdivision of lead absorption—the term "poisoning" being confined to cases of lead absorption presenting acute manifestations.

The plain intent of the New York law is to compensate the given disease well before the acute stage results in total disability, so that the term "lead absorption" is synonymous under the law with the term "lead poisoning." For this reason it is argued that the former term be substituted for the latter in the compensation law. The following fundamental points regarding lead absorption should be kept in mind:

1. In any given individual, lead may be present in his body either in toxic or non-toxic form. In an individual where all of the lead present in his body has been stored in his bones, it is non-toxic to him for the time being.

2. Lead which is present, however, in the circulating blood may be either toxic or non-toxic, depending upon the quantity of lead present. It is only in those cases where toxic quantities of lead appear in the circulation that any incapacity may occur, and it is only those cases which are, therefore, of any interest to the Compensation Tribunal.

3. Lead workers are just as subject as any individual to the ordinary ailments such as ordinary stomach ache, gastric ulcer, ap-

pendicitis, etc. It is quite obvious, therefore, that all other causes be definitely eliminated in considering the health of a lead worker quite as much as in making a differential diagnosis in any other individual.

Confining ourselves to those cases where lead is thought to be actively present in the body in toxic amounts, resulting in clinical manifestations of disability, we may divide these for the present purpose into two groups, depending upon whether the manifestations are such as to produce definite demonstrable disability, or are merely subjective, resulting in a claimed disability, the existence of which may be difficult to prove.

I. Cases with Positive Disability
   A. Cases with Positive Laboratory Findings (Procedure given)
   B. Cases with Negative Laboratory Findings (Procedure given)
II. Cases with Doubtful Disability (Diagnostic Possibilities)

The importance of laboratory examinations of both blood and urine in every lead case cannot be overemphasized.

A new bulletin on the subject of Lead Poisoning in New York State, with special reference to the study of the health of 381 lead workers, is now in the hands of the printer and will be ready for distribution in the near future. This bulletin will be mailed to anyone interested, upon request.—May R. Mayers, *Indust. Hyg. Bull.*, N. Y. State Dept. of Labor, V, 4 (Oct.), 1928.

A New Test for Industrial Lead Poisoning—Following upon a previous report by McCord, Minster, and Rehm in 1924, the author gives the summary and later experience with his counting method of estimating the number of basophilic cells in cases of lead poisoning. The importance of lead poisoning includes its ingestion without absorption, with absorption, and with intoxication. Immature red cells are produced in the bone marrow having certain characteristics of which basophilic substance appears to be the most constant and includes polychromatophilia or polychromasia, punctate stippling and basophilic aggregations. The methods of detecting basophilic material with Wright's stain, Robertson's method for counting of reticulated cells, also Cunningham's method, the Friedlander-Wiedemer method of enumeration of basophilic red cells and the basophilic aggregation test of the author are reviewed. Clinical and laboratory materials necessary are given, also illustrations of blood findings and a discussion of basophilic red cells in normal persons and as an index of exposure to lead, and in clinical lead poisoning with case citations.

Among fifteen points included in the summary are these: The number of basophilic red cells found in 145 normal adults was commonly less than 1,000 per cu. mm. of blood, and rarely exceeded 5,000 in certain physiologic states. The number of such cells is increased above normal in the following pathologic states:

Lead intoxication, benzol poisoning, arsenic poisoning, in all types of anemia in which there is regeneration, hemolytic icterus, following hemorrhage, leukemias, at times in acute infections, in neoplasms involving the bone marrow, and in polycythemia.

In the absence of other conditions presenting high basophilic red cell counts a high basophilic red cell count in a person exposed to lead is accepted as indicative of lead absorption or lead poisoning.

The application of these methods suggests that in lead industries many workers commonly regarded as unexposed, such as office workers, clerks, etc., actually may also absorb much lead and thus become potential cases of lead intoxication. This is especially true if the hazard of lead is in the form of dust.—Carey P. McCord, *U. S. Bur. of Labor Statistics*, No. 460 (Apr.), 1928, 33 pages.

Health of Workers in Dusty Trades—The U. S. Public Health Service has completed a study of the health of workers in a Portland cement plant, the first of a series covering the dusty trades, according to an announcement recently made by Surgeon-General H. S. Cumming. The study was undertaken to ascertain whether persons

working in an atmosphere containing numerous minute particles of a calcium dust suffered any harmful effects. The investigation was conducted in one of the older, dustier plants, so that the effect of large quantities of the dust could be observed. Records of all absences from work were kept for 3 years, and the nature of disabling sickness was ascertained. Physical examinations were made, X-ray films taken, and the character and amounts of dust in the atmosphere of the plant were determined.

The results of this investigation indicated that the calcium dusts generated in the process of manufacturing Portland cement do not predispose workers to tuberculosis nor to pneumonia. The workers exposed to dust experienced, however, an abnormal number of attacks of diseases of the upper respiratory tract, especially colds, acute bronchitis, diseases of the pharynx and tonsils, and also influenza, or grippe. Attacks of these diseases serious enough to cause absence for two consecutive working days or longer occurred among the men in the dustier departments at a rate which was about 60 per cent above that of the men in the comparatively non-dusty departments. Limestone dust appeared to be slightly more deleterious in this respect than cement dust.

Outdoor work in all kinds of weather such as was experienced by the quarry workers appeared to predispose to diseases of the upper respiratory tract even more than did exposure to the calcium dusts. In the outdoor departments of the plant, also, the highest attack rates of rheumatism were found. The study also indicated that work in a cement dusty atmosphere may predispose to certain skin diseases such as boils, to conjunctivitis, and to deafness when cement dust in combination with ear wax forms plugs in the external ear. When the dust in the atmosphere is less than about 10 million particles per cu. ft. of air it is doubtful whether the above-mentioned diseases and conditions would be found at greater than average frequency.

Modernization of plants and installation of ventilating systems are helping to solve the dust problem of the industry.—*Health News*, U. S. P. H. S., E-19, 1928.

Industrial Hygiene in Model Health Ordinances—The following is excerpted from the Progress Report of the Sub-Committee on Model Health Ordinances, presented at the Chicago meeting of the American Public Health Association, October 15, 1928:

Institutional and Occupational Care

1. There should be an ordinance giving the Board of Health authority to license and supervise certain classes of occupations and institutions relating in any way to public health and such regulations should include hospitals, dispensaries, institutions, laboratories, homes for children, midwives, and occupations likely to be a hazard to health.

Industrial Hygiene

1. There should be an ordinance which provides that all manufacturing and industrial plants where processes are used which are dangerous to the health of the workers be subject to special rules and regulations of the Board of Health.

Health Hazards in Chromium Plating—Chromium plating is developing rapidly in the United States. It has long been known that, in the manufacture of chromic acid and chromates, the operators are subject to attack by an ulcerative process and perforation of the nasal septum; and to the formation of ulcers or "chrome holes" upon the hands or other exposed parts of the body. Accordingly, some provisions have been made in all chromium plating plants for artificial ventilation and for other sanitary measures. In spite of these precautions, however, the employes in some plants have been affected in the above mentioned ways.

In order, therefore, to determine the extent of the hazard and the best means of overcoming it, a survey was conducted in several commercial plants. This included a study of the methods and degree of ventilation, of the concentrations of chromic acid in the air breathed by the workers, and a physical examination of the workers themselves. Although only 6 plants were visited, and 23 persons examined, the results were so consistent in different plants, and agreed so well with previous experience with chromates, that certain tentative conclusions and recommendations are warranted.

It was found that exposure to very low concentrations of chromic acid, e.g., one mg. in 10 cu. m. of air, or 1/60 gr. in 350 cu. ft. (which may be considered approximately the volume of air breathed by a worker in eight hours), is sufficient to cause nose bleed and nasal inflammation in a week or less. Higher concentrations or longer exposures cause extensive attack and even complete perforation of the nasal septum. This is painless, however, and the operator may be entirely unaware of the perforation. Many of the employes were found to have chromium ulcers on the hands or other exposed parts of the body. No evidence was found of injury to the respiratory tract except in the nose, nor of any effect upon the digestive system or the kidneys.

While, therefore, there is a real hazard in chromium plating, it is not critical, and can be entirely eliminated by suitable measures. These should include an effective system of ventilation in which the air is drawn horizontally across the plating tanks into a narrow duct in which the air velocity should be about 2,000 feet per minute. So far as possible, rubber gloves, aprons, and shoes should be worn. Frequent applications of vaseline or mentholatum salve to the nose and hands greatly reduce the danger of ulceration. All cuts and abrasions of the skin should receive regular inspection and medical treatment.

If these simple, entirely practicable measures are taken, the hazard can be practically eliminated. There is no reason, therefore, to fear any serious injuries from the extension of chromium plating that is likely to occur in the next few years.—*Health News*, U. S. P. H. S., 38, 1928.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

Continued Administration of Iodide and Other Salts. Comparative Effects on Weight and Growth of the Body—Criticism directed against the continued administration of iodide in small amounts and the lack of any study of the action of these compounds over long periods has prompted this investigation. Experiments were carried on for a period of 4 years with rats as experimental animals. The rats were maintained on an adequate diet which included yeast, cod liver oil, and Osborne and Mendel salt mixture which contains about 0.0032 per cent of potassium iodide. Dry sodium iodide was administered in a concentration of 0.01 per cent, corresponding to approximately 1 mg. daily per rat, a dosage corresponding to about 0.23 gm. (3½ gr.) daily for an adult of 70 kg. body weight. This dosage corresponds to the iodide

medication in simple goiter and for certain chronic inflammations and is much greater than the daily dose of iodide received from the use of iodized table salt.

Other salts were tried: sodium sulphocyanate in concentration of 0.007 per cent; sodium bromide, 0.0054 per cent, representing respectively daily doses of about 0.6 and 0.5 mg.; arsenic, as Fowler's solution, in concentration of 0.01 per cent of arsenous oxide, the daily dose per rat being 0.76 mg. arsenic trioxide; sodium borate in a concentration of 0.014 per cent, the daily dosage being 1.12 mg. per rat; thallium acetate in a concentration of 0.0014 per cent, or 0.11 mg. per day per rat. Results are shown in graphs, curves representing median values at the end of each month, although weekly records were kept. The conclusions with respect to iodide are: (1) increase in body weight or growth some time during the course of the experiment; (2) in contrast with the iodide and generally with the controls, reduction in body weight and growth after medication with other salts. Approximately for all iodide groups the increase is about 10 or 15 per cent. Rats on the iodized food consumed the same amount as controls on untreated foods, and the body weight increases are apparently, therefore, independent of the food consumption. Only one group showed a loss of body weight over a period of 7 months but the consumption in this case was 6 per cent less than that of the controls. Rats on a deficient diet were given iodide, also arsenic and manganese. The iodides improved growth and prolonged life while rats on arsenic and manganese showed loss in weight and earlier death than both the iodide and the control rats. The results with other salts showed that sulphocyanate was responsible for a loss in body weight of approximately 10 per cent and the daily consumption of food was also less. With arsenic in two experiments losses in body weight of 20 and 10 per cent respectively occurred and food consumption was reduced about 22 and 10 per cent. Sodium borate, over 7 months, caused an approximate loss of 17 per cent in body weight and a reduction of food consumption of 10 per cent. Thallium acetate was the most toxic of all, causing the death of one group at the end of 4 months. Body weight was decreased 13 per cent and food consumption 16 per cent. The depilatory action of thallium appeared at the end of 6 weeks and sudden fatalities in the rats appeared disproportionately with the loss of weight and food consumption. Sodium bromide resulted in a loss of 11 per cent body weight and 2.2 per cent in food consumption. These experiments confirm the work of previous investigators in reference to the toxic effect of arsenic and boron and correlate the recently reported experiments on the increase in production of milk after the administration of iodides to cows. The authors conclude that there is no ground for the belief that continued use of small doses of iodides under ordinary conditions would have a deleterious effect but there is reason to believe that it will be beneficial. The conclusions, however, do not apply to the administration of the drug in large doses.—P. J. Hanzlik, E. P. Talbot, and E. E. Gibson, *Arch. Int. Med.*, 42: 579 (Oct.), 1928.

Dietary Requirements for Fertility and Lactation: The Vitamin A Content of Wheat Oil—This study was undertaken to determine the vitamin A content of wheat oil in view of conflicting reports of other investigators, particularly since wheat oil is used by most investigators for the study of vitamin E. Young rats, after weaning, were allowed to remain with the lactating mothers on a diet deficient in fat-soluble vitamins until the development of ophthalmia. Wheat oil was adminis-

tered separately from the ration in carefully measured graduated amounts and the controls received comparable amounts of cod liver oil. The wheat oil was administered in dosages of 0.01 c.c., 0.05 c.c. and 0.1 c.c. per animal per day. The animals were weighed twice a week and food consumption records kept. In the experiment in which 0.01 c.c. wheat oil was fed not all the animals maintained good growth, and the results show that this amount is not even comparable with 0.01 c.c. cod liver oil for vitamin A. Better results were secured with the administration of 0.05 c.c. wheat oil. A daily dosage of 0.1 c.c. wheat oil resulted in completely clearing advanced ophthalmia in 17 days. It is noted that the rats on wheat oil which was ineffectual in curing ophthalmia showed a marked reduction in food intake until complete inanition occurred. It is concluded from this that the vitamin A is an important factor, together with vitamin B, in conditions of anorexia. This experiment shows conclusively that there are appreciable amounts of vitamin A in wheat oil sufficient to maintain excellent growth for a period of 10 to 16 weeks.—Barnett Sure, *J. Agri. Res.*, 37: 93 (July 15), 1928.

Blood **Regeneration in Severe Anemia. XII. Potent Influence of Inorganic Ash of Apricots, Liver, Kidney, and Pineapple**—Two of the authors (Robscheit-Robbins and Whipple) observed 8 years ago that apricot feeding had a beneficial effect in experimental anemia in dogs. Two hundred gm. of this fruit (or peaches) increased the hemoglobin 40 to 45 gm. above the controls for a 2-week period. Since the salts were regarded as a potent agent, this experiment was undertaken to observe the effects of feeding ash to anemic dogs. Standard bread was used which maintains the hemoglobin production at a low level, 1 to 3 gm. of hemoglobin per week. A method is given for the preparation of pure ash from liver and other substances without adding any chemicals to aid incineration. The ashes were analyzed for organic matter, silica, copper, antimony, iron and aluminum, calcium, magnesium and phosphates. Apricot ash proved a stimulant to hemoglobin production over a 2-week period from 42 to 65 gm., the average of the whole series being 40 to 50 gm. hemoglobin. Liver ash feeding over the same period shows production of 38 to 65 gm. hemoglobin above controls. The liver ash experiments showed the same "carry over" into 2 or 3 weeks of the after period as noted with fresh liver. Kidney ash is similar to liver ash. Pineapple ash was found much less potent than other ashes. This product was not prepared by the experimenters but was obtained from Hawaii. A table is given of the average values of the elements in the ash analyses in which it is noted that copper is high in the apricot ash but abundant in all. Iron is also abundant but more so in kidney ash. Experiments show that the ash of dried apricot retained most of the potency of the whole apricot but that beef liver and pig kidney each contains about one-half the potent factors present in the whole cooked organs.—Frieda S. Robscheit-Robbins, C. A. Elden, Warren M. Sperry, and G. H. Whipple, *J. Biol. Chem.*, 79: 563 (Oct.), 1928.

Blood Regeneration in Severe Anemia. XIII. Influence of Certain Copper Salts upon Hemoglobin Output—The presence of iron and copper in ash of certain foods which have been shown to have a profound effect in blood regeneration in severe anemia has led to a study of the inorganic constituents, particularly iron and copper salts. Copper sulfate in small doses, 65 mg. copper (252 mg. of copper sulfate per day), results in increase of about 20

gm. hemoglobin over a 2-week period. Larger doses of copper cause lack of appetite. Copper tartrate was found to be no more potent than copper sulfate. Copper salts mixed with iron salts are much more potent than copper salts alone. Twenty mg. of copper and 36 mg. of iron as metal in daily doses resulted in an increase of 42 to 80 gm. hemoglobin over a 2-week period. An experiment in which a large dose of ferric chloride and an average dose of copper tartrate were given showed an increase in hemoglobin which was regarded as no more than that which would be due to the iron alone. Similar experiments with copper and zinc resulted in hemoglobin production no more than would be expected from the amount of copper alone.—C. A. Elden, Warren M. Sperry, Frieda A. Robscheit-Robbins, and G. H. Whipple, *J. Biol. Chem.*, 79: 577 (Oct.), 1928.

The Iodine Content of Cape Cod Cranberries—The iodine content of cranberries grown in southeastern Massachusetts is of interest because of the nearness of the sea, which affects the ground waters. Three lots of cranberries were analyzed—one from stored crates awaiting shipment, one from a bog on a strip of land called Sandy Neck, and the third from a bog in the center of Nantucket Island. Several charges of 500 gm. each were analyzed by the method of Von Fellenberg. Cranberries from Sandy Neck, which is nearest to the sea, showed 35 parts iodine per billion, while those from the crates showed 26 parts per billion and those from Nantucket showed 27 parts per billion. Von Fellenberg (*Biochem. Ztschr.*, 139: 371, 1923) reported figures showing iodine content of certain foods as follows: apples without cores 1 to 6 parts of iodine per billion; orange pulp 16 parts; potatoes 11 to 18 parts; cabbage 6 to 20 parts; lettuce 6 to 18 parts. When compared with these figures, cranberries from southeastern Massachusetts have a relatively high content of iodine.—Fred W. Morse, *J. Biol. Chem.*, 79: 409 (Oct.), 1928.

A Comparison of Raw, Pasteurized, Evaporated and Dried Milk as Sources of Calcium and Phosphorus for the Human Subject—Calcium and phosphorus balance experiments were carried out in 3 series, both children and adults being used as subjects. Foods were bought in quantity so that the composition would not vary. A standard brand of dried milk made by the spray process and a popular brand of evaporated milk were used in all experiments. Tables are given showing the different foods and amounts given, together with the calcium and phosphorus balances. Experiments with five children showed that the child retains more calcium when it is supplied in fresh milk than when supplied in dried milk. All adult subjects showed more favorable calcium balances with fresh milk than with dried milk. Pasteurized milk was less favorable than fresh milk while milk from cows which were kept in a barn away from sunlight was less favorable than the fresh milk. Evaporated milk showed balances as good as fresh milk. Phosphorus balances were about the same as the calcium although the amount of milk used supplied smaller proportions of the phosphorus of the diet.—Martha M. Kramer, Esther Latzke, and Mary Margaret Shaw, *J. Biol. Chem.*, 79: 283 (Sept.), 1928.

CHILD HYGIENE

MERRILL E. CHAMPION, M. D

Preschool Health Supervision in a Large City by a Voluntary Agency—The Minneapolis Infant Welfare Society as a result of 8 years' experience with preschool clinics has gradually extended habit training to the infant clinics and has also increased the upper age limit of infants to 4 years. "A progress chart of the infant's mental development and habit formation is kept from the 12th month to the 4th year; if any difficult problem arises the case is turned over to the preschool department for more intensive study." In the preschool clinic itself 70 per cent of the children are referred from the infant department.

An interesting and sound feature of these clinics is that habit problems are considered along with physical defects by the regular clinic staff, thus treating the child as an entity and not as a dissociated personality. Unusually difficult cases in the mental field are referred to the Child Guidance Clinic of the public schools. There is intensive follow-up of all cases in the homes.

Tables accompany this paper analyzing 400 consecutive cases attending the clinic. One of these "presenting the conditioning factors shows that, outside of 137 physical conditions, the majority of factors resided in the parents or environment, a potent argument for parental education." Most of the children were brought to the clinic because the parents felt there was a physical basis for their ills.

It is interesting to note that there are given as the most important two causes of failure in the clinic "poor coöperation on the part of the parents and failure of parents to improve even though they tried to coöperate."—From a paper given before the A. C. H. A. and A. P. H. A. Annual Meeting, 1928, by E. J. Huenekens, M.D.

Filling the Teeth of the Preschool Child—The national Congress of Parents and Teachers complains, according to the *Journal of the American Dental Association,* that parents of young children are unable in many instances to get dentists to attend to the deciduous teeth. This has come to light as a result of the summer round-up of children about to enter school for the first time in the fall. The dental journal's comment goes on to say that an examination of 1,087 second grade children in 40 different localities in Michigan showed that almost half of them had infected deciduous teeth.

A symposium is quoted dealing with the point in question. It demonstrates quite conclusively what stand is taken by various leaders in the dental profession. A few of the opinions expressed are quoted below:

C. J. Lyons, D.D.S., Professor of Oral Surgery, University of Michigan:

An old tradition that deciduous teeth under all conditions should be retained until their successors erupt is one that today is responsible for much illness among school children. Much greater harm will be done the little patient by leaving the infected tooth in the mouth at any age than will be done by extracting it. When caries in deciduous teeth has progressed to a point where fillings cannot be retained these teeth should be extracted regardless of the age of the child.

Harris R. C. Wilson, D.D.S., Director Cleveland School Dental Clinics:

The mesio distal dimensions of the bicuspids are completed at 5 or 6 years of age, if not

at 4; therefore these bicuspids are as large as they ever will be. . . . The problem of holding space with the temporary molars after 6 years of age is practically nil. At 3 years of age, I grant that the retention of the temporary molars is decidedly important; but even in this case, 3 years of age, I should not submit a child to the danger of serious infection from a non-vital temporary molar. . . . The old idea of holding space is obsolete in the mind of men who have had clinical experience of any considerable volume.

A. C. Thompson, D.D.S., Director Dental Service, Detroit Dept. of Health:

We find in our schools thousands of children with abscessed teeth due to lack of care. It has been our policy to remove every infected tooth that cannot be rendered free from infection. An abscessed temporary tooth uncared for is just as dangerous as an abscessed permanent tooth. Neither one should be tolerated.

From *Bull. Mich. State Dental Soc.*, Sept., 1928.

Dental Health Educational Materials—The old slogan "A Clean Tooth Never Decays" has done great harm in preventive dentistry, says William R. Davis, D.D.S., Director of the Bureau of Mouth Hygiene of the Michigan Department of Health. "This expression is true only for surgical cleanliness, and surgical cleanliness is impossible so far as we know in the mouth of a live person and not very important in a dead one.

"Many teeth that are brushed decay and many teeth that never saw a toothbrush never decay. No dentist on earth can make badly broken down and aching teeth as good as new. Why broadcast such teaching? Educational material that is not true or is out of focus should not be used, no matter how attractive.

"We have led many school boards and teachers to believe that toothbrush drills and cleaning teeth are the whole thing in a dental health program. In certain cases it will help prevent decay. Use of the toothbrush is a good habit, like taking a bath or washing the face. Twice a day, before going to bed and after breakfast, is a reasonable frequency to teach. Why teach five times, which is unreasonable? Why teach using gauze on the finger and boric or salt solution daily to wash the mouth of an infant which is correctly fed and in good health, when clinical experience shows that it does more harm than good?

"The two greatest factors in mouth hygiene are diet and early dental attention. It has been proved quite conclusively that wrong diet promotes decay and correct diet retards decay. If we could have early attention to small defects and correct diet, I believe we could almost wipe tooth troubles off the map even if another toothbrush was never manufactured. This may be rank heresy, but I believe research and clinical evidence are proving it."—From a paper given before the A. C. H. A. and A. P. H. A. Annual Meeting, 1928, by W. R. Davis, D.D.S.

Urologic Conditions Encountered in Children—Neglect of urological examination still being a not uncommon occurrence, this article is of interest and value. It is urged that the same thorough and complete urologic examination and study be made of the child presenting urinary symptoms as of the adult.

Children may be subject to "practically all the various urologic lesions which are encountered in adult life up to the fifth decade, though the symptoms and signs may in many cases be inaccurately described and entirely misleading."

Some pediatricians still hesitate to make a cystoscopic study, but with modern instruments perfected as they are, such examination is perfectly practicable.

In the series presented the youngest patient was 4½ months of age and cystoscopic examination, ureteral catheterization and functional kidney tests

were successfully made. Many patients received light ether anesthesia or nitrous oxide for the few minutes required to examine the bladder and urethra and to catheterize the ureters.

A preliminary hypodermic injection of morphine and atropine removes any inhibition of renal function from anesthesia. Cases cited in detail include retention, pyelitis, lithiasis, hydronephrosis, pyonephrosis, tuberculosis, congenital abnormalities and diverticulum of the bladder.

Pyuria and hematuria are noted, particularly as definite indications for early and complete urological study, and emphasis is laid on a belief that "early diagnosis and appropriate surgical treatment will, in most instances, prevent extensive and permanent renal injury."—B. A. Thomas, M.D., and J. C. Birdsall, M.D., *J. A. M. A.*, Nov. 10, 1928.

Training the Child's Emotions—Emotions determine the spice and flavor of life. But emotions, like all other functions of a growing body, must be trained for social living.

Children learn to control and develop their emotions by imitating the behavior about them in their homes, in school, on the playground and in the Sunday school. They respond to influences of their parents, of their reading, of the movies and theaters and of their observation of life.

The binding social force in the emotional life of the child arises from some sense of personal pleasure and satisfaction through accepting the standards of the family and the group to which he belongs. Emotions are related to some simple physical affairs, as, for example, consciousness of one's own size or strength or appearance. The emotional distress of a homely child or of an oversized child in a low grade sometimes beggars description.

The emotions are also bound up with the intellectual life. A high degree of intellectual activity may be a source of comfort and joy, while a limited capacity may give rise to sullenness, irritability and unpleasant school conduct.

The child's emotional reaction toward school is of primary importance. Every child should have some success in school. Even if the success is slight, praise and encouragement should always be given.

The child, however, is more than body and intellect. He is a part of the social world, subject to its laws and regulations. The pressure of social living causes strains within the child and the expression of these strains reveals the emotions that are entering into character. Hence the companionships of children, the mode of treatment by the adults about them, the behavior, the ideas, the sentiments and the practices of the parents profoundly affect the emotional life of the child, which involves his own happiness and that of his family and friends.—Ira S. Wile, M.D., *Hygeia,* Dec., 1928.

A Clinical Study of Enuresis—Any reliable addition to our present slight knowledge of causes and treatment of enuresis is always appreciated. In this study careful clinical analysis of the factors popularly supposed to be accountable for enuresis—relation of diseased tonsils and adenoids, eye strain, phimosis, vaginitis, pyelitis, posture, malnutrition or neurotic constitution—"failed to show their relation to this disease."

Cures, which amounted to about 80 per cent of this series of cases, "were accomplished without regard to any of these factors by measures directed to the bladder itself."

"The term 'enuresis vera' is suggested to indicate that type in which dissociation between the brain and the voluntary nervous system, as concerns the physiology of micturition, actually appears to exist, and the term 'pseudo-enuresis' is reserved for that type of defective control which can be relieved by measures designed to influence the will or to obtain the coöperation of the child."

The only measures found effective in the treatment of "true enuresis" were atropine and massage of the bladder.—Adrien Bleyer, M.D., *Am. J. Dis. Child.*, Nov., 1928.

PUBLIC HEALTH NURSING

MIRIAM AMES, R. N.

REPORT OF THE SUB–COMMITTEE ON NURSING OF COMMITTEE ON ADMINISTRATIVE PRACTICE *

IT seems advisable to go a little into the background of the committee's studies in nursing, in order to arrive at the reason for the present-day need of a sub-committee on nursing. In making the original appraisal form, the National Organization for Public Health Nursing was consulted at every step of the way about the place that nursing should take in organizations. Anne A. Stevens, R.N., who was then the Director of the N. O. P. H. N., gave a great deal of time to this. Nursing groups were apparently satisfied with the advice given and the conclusions reached.

Since that time, it has been nobody's job in particular to keep up to date on the appraisal or to advise in relation to its interpretation or evaluation. One of the reasons for the formation of such committees as ours was a growing feeling on the part of nursing groups that, when studies were made which involved nursing problems, some formal committee should be consulted in relation to conclusions arrived at and the recommendations made.

The N. O. P. H. N. is also making nursing studies and the volume of such studies is steadily increasing. It was considering an advisory committee to consult with its staff on field studies made. Consequently, with two groups making studies in the field the time seemed ripe to have a committee of each, which should function separately in relation to each group and jointly in regard to the relation of one group to another.

Naturally common problems would arise in relation to the scope of each group making studies; the kind of information to be gathered; the schedules for gathering such information; the evaluation of such studies; the conclusions and recommendations arrived at; and the coördination of one group to another.

The N. O. P. H. N. appointed a committee which is synonymous with our A. P. H. A. committee on nursing with one exception—the Director of the N. O. P. H. N. is a member of the A. P. H. A. committee, but is naturally not on the N. O. P. H. N. committee.

FUNCTION OF THE COMMITTEE

The function of a committee such as ours might be:

To assist in keeping the appraisal up to date

To assist in evaluating nursing services in relation to changing needs

To keep the field staff advised regarding general nursing trends and policies

To advise in relation to the extension of studies in nursing

To assist in working out some method of ascertaining qualitative as well as quantitative practice

To advise in relation to making specific studies

To be the medium of problems in relationship to the N. O. P. H. N.

To work out plans for coöperation and coördination with the N. O. P. H. N. in their nursing studies

Eventually, it is hoped that we may be able to work out some more definite

* Presented to the Committee on Administrative Practice of the American Public Health Association in New York, N. Y., May 24, 1928.

conclusions in regard to certain nursing practices and policies.

The committee has had one meeting as a whole with Dr. Walker, at which we discussed and reviewed the potentialities of the committee.

Dr. Walker met with the Advisory Committee of Field Studies of the N. O. P. H. N., at which meeting we reviewed their schedules for studies and also discussed some of the common problems, such as the extent of information it was advisable for the N. O. P. H. N. to give; the need of both the A. P. H. A. and the N. O. P. H. N. being in accord with relation to certain recommendations which they might make in relation to nursing studies.

SOPHIE C. NELSON, R.N., *Chairman*
MARY LAIRD, R.N.
AMELIA GRANT, R.N.
JANE C. ALLEN, R.N.

Annual Reports—"Annual reports can be roughly classified as surveys or obituaries," says the *Health News*. The better kind tells what has been accomplished and how this was done, and compares results so that contrasts between poorly done and well done health work show up clearly.

"In one sense an annual report should be like the record of a periodic health examination—designed to show up defects and to point out methods of prevention and cure."—*Health News*, New York State Dept. of Health, V: 47 (Nov. 19), 1928.

California Provides for Crippled Children—The Crippled Child Act of the 1927 legislature has been in operation less than a year. Due largely to the efforts of the California Society for Crippled Children, legislation was secured. It proved to be a timely measure, for an acute epidemic of poliomyelitis was more widely spread throughout the state in 1927 than ever before in history. While the Act has provided for all handicapped children, it is the sufferers from infantile paralysis who have benefitted from the provisions outlined in this Act.

The plan under which the law operates is outlined briefly in an article entitled "The Care of Crippled Children," in the November issue of *The Pacific Coast Journal of Nursing*.

Needy, physically defective or handicapped persons under eighteen years of age and residents of California who should have necessary surgical, medical, hospital, physiotherapy, occupational therapy or other service, special treatment, materials or appliances for use in relieving their defective or handicapped condition, may now obtain any or all of these at County expense under the provisions of the so-called "Crippled Child Act" of the 1927 legislature. Treatment is provided only for handicapped individuals, whose parents or guardians are unable to provide necessary treatment either wholly or in part.

It is the duty of the State Department of Public Health to furnish the necessary treatment and services upon presentation of a certificate from the parent or guardian stating that he is unable to furnish care.

The state does not bear the expense of the treatment, for all money expended under the authority of this certificate constitutes a legal charge against the county from which the certificate is issued.

Hospitals are opened to these patients and have local public diagnostic clinics. Health workers are generally informed regarding the times and places at which clinics and conferences are held.

A strict supervision over all cases under its care is maintained by the State Department of Public Health and, for this reason, a supervisor has been appointed. Visits are made and records are kept, so that improvements may be noted as they occur.

The State Department of Public Health is enabled by law to enter into agreements with parents and guardians to pay such amounts as they may be

able toward the cost of service, equipment and its transportation.

The law further empowers the State Department of Public Health to receive gifts, legacies and bequests to expend for the purposes outlined in the Act, provided no part of such funds shall be used for administrative purposes.

Counties are authorized to provide treatment independently for these cases or they may coöperate with the State Department of Public Health. A tremendous amount of good has been accomplished for the children of California as a result of the application of this law.

NOTE: According to reports, the Act in its present form is not entirely satisfactory. This is due, in part, to the number of patients requiring surgical treatment and also to the prolonged nature of the illness. Few counties could finance the program. It has been suggested that the expense be borne jointly by the county, state, service clubs, local welfare organizations and parents and guardians.

The matter of treatment of these cases brings up the problem of both scholastic and occupational education. The need for convalescent homes conveniently located and planned with an idea of giving necessary scientific treatment is already being demonstrated.

Until the program can be carried out along these constructive lines, full benefit will not be derived from the new law.—

Crippled Child Act, *Pacific Coast J. Nurs.*, Nov., 1928.

Permanent Responsibility versus Temporary—"What the Future Holds for Public Health Nursing under the American Red Cross" is discussed by Elizabeth G. Fox, R.N., in a recent pamphlet of that name. The first decade of the post-war nursing service is ending, and in the light of these past ten years Miss Fox raises the questions: "Where are we? Where do we want to be? How do we get there?"

The Red Cross is wholly or in part responsible for 568 public health nursing services, and is the largest single employer of rural nurses in the country. The rural field, however, is far from adequately covered; there is still great need for strong central promotion, guidance and support, such as the Red Cross, from its hard won experience, is well equipped to give.

Because of this, Miss Fox feels that the Red Cross should cease to consider its function as that of demonstrating public health nursing, and should adopt instead "an ideal of permanent responsibility for public health nursing in the community, and a policy of perpetuating partnership with public authorities."

This may be done by equal contribution of funds on the part of the chapter and the public agency, or by the official agency carrying the greater part of the expense while the chapter assumes the responsibility of administration. The Red Cross has much to contribute in experience, maintenance of standards, community interest and good will, as well as offering constructive program planning over a period of time, despite political upsets or changes of health officials.

With this ideal of long time responsibility on the part of the Red Cross for public health nursing activities, Miss Fox goes on to discuss problems which chapters will meet and lines along which they may well develop, touching on the need for nursing care of maternity and sick patients, prenatal supervision, the needs in counties of large area and small population, etc. Her conclusion shows the present position of the Red Cross Public Health Nursing Service:

It is ready now for its maturity; ready to put its hard-won experience to use in developing its services in accordance with growing demands and advancing standards; in pushing out experimentally into difficult fields; in seeking ways appropriate to the small town and village; of developing community nursing on a scale comparable with that in the cities.

L. A. D.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

The Big Idea for Minneapolis—The Cincinnati meeting of the Public Health Education Section was notable for the initial presentation of the diphtheria campaign. Chicago will be long remembered by many because of the two consecutive sessions on program planning. Before this paragraph is published the Section Council will have had a meeting to plan for Minneapolis, but an eager welcome is assured any suggestions for the "big idea" and for lesser ideas for the 1929 program of the Section. Address the chairman, Ira V. Hiscock, Yale University, New Haven, Conn.

Wherever There are Two or More—In any community or convention where there are as many as two people interested in some phase of health education-publicity there is the material for a get-together, formal or informal. From some of those who have been testing the idea comes the testimony that it is quite worth while simply to get together at luncheon now and then and chat over methods and problems. Merely "talking things over" may help a lot. The editor would like to hear of any groups getting together in any fashion.

Cross Word Puzzles—Questions and Answers—The Annual Directory of Newspaper Syndicates (*Editor and Publisher*, Aug. 25, 1928) lists 11 different syndicates selling cross word puzzles to newspapers. This fact and the very interesting "Do You Know" series appearing every Sunday in the *New York World* emphasize anew that these forms of publicity-education are by no means worn out. But when we adapt them to health and other social work they need to be well done.

Publicity Awards in June, 1929—Modest awards carrying great honors will be made for the best in news photographs, annual reports, radio talks, posters, feature stories, and Sunday magazine stories of 1928–1929. The awards will be made at San Francisco in June, 1929, by the Committee on Publicity Methods. A number of the 1928 awards were made to readers of this department.

A Popular Reference Book for Public Use—Make up a scrap-book or loose-leaf binder covering the patent medicines and undesirable remedies sold, advertised or known to be popular in your community. Get material from American Medical Association and other thoroughly reliable sources, securing two copies where material is on both sides of the sheet. Start each remedy at top of page and arrange in a b c order. When you announce the new book invite suggestions of remedies to include. Place on a shelf, with a big sign, where it can be consulted without asking for it. Tuberculosis societies and others might try this on their specialties. Something to be mentioned from time to time; usefulness not limited to the number actually consulting it. A committee of women might do the work of clipping and arranging the material. (Yes, this is a good idea. Let the scrap-book con-

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

sist of newspaper clippings of patent medicine ads, with brief typewritten exposé under each. *Nostrums and Quackery,* published by the American Medical Association, will give information on many of them. Some years ago I prepared such a scrap-book for the Better Business Commission of Toledo with good result. A scrap-book might also be sent to newspaper editors, but be very tactful about it.—H. E. K.)

EXHIBITS

An exhibit of the Delaware County Tuberculosis Association: A wall map 4 by 5 feet, black and white outline with heavy lines for township and county boundaries. The 140 deaths, 1927, were indicated by

> . . . 6 volt flashlight bulbs which are, I think, much more durable and take up less space than the bulbs that are commonly used in decoration. A transformer cuts the voltage down from 110 to 6. Bulbs representing deaths of negroes have been dipped in green Franco Print Lamp coloring. The bulbs representing deaths of white people we are allowing to remain white. Our first thought was to color these red but since we want to use the map in daylight as well as at night, we were afraid that the red lights would be too dim to attract much attention.—
>
> Charles Kurtzhalz

STUNTS

> And while we're on the subject of putting out fires, it occurs to us that the fire wagons and fire houses in every town and city in Indiana are the most important cynosures at least when some place is on fire. Why not ask the fire chief to carry a banner on the side of the fire wagons during December, where it'll make big publicity when there's a fire. The banner might say: "Put Out the Tuberculosis Fire with Christmas Seals!" And on the top of your traffic semaphores a great big Seal Sale sign could be implanted, urging those who pass the corners to "Drive Safely—Buy Christmas Seals!"—
>
> Indiana Tuberculosis Association

The ship on the 1928 Christmas seal inspired a whole new line of stunts and more or less dramatic presentations of health and tuberculosis ideas. Mrs. W. H. Griffith, Sioux City, Ia., prepared several features in which music, readings, or dialogue provided new settings for old truths. All this emphasizes the possibilities in varying the form in which health facts and ideas may be offered and new angles of interest may be developed. History, news, personalities and other elements may be drawn upon for settings for health messages.

CLASSES

The most extensive course in health education-publicity yet available is that announced by the National Tuberculosis Association and Columbia University for January 14–26, which is open only to workers who have had some definite training or experience in publicity. Address the University, or Philip P. Jacobs, the conductor, National Tuberculosis Association, 370 Seventh Ave., New York, N. Y.

Also address Mr. Jacobs regarding the tuberculosis institutes, which include education-publicity sessions, to be held in Philadelphia, Pa. February 25–March 9), Columbus, O. (April 8–20), Minneapolis, Minn. (June 17–29), and probably Nashville, Tenn.

An evening course in educational publicity will be conducted (January 2–March 23) by the New York School of Social Work, intended primarily for executives and those doing publicity work. This, and the regular spring term course (March 25–June 15), will be conducted by Mr. and Mrs. Routzahn. Both of these courses call for much real work by the students.

TIMELY TOPICS

Colds, temperature, ventilation—an opportunity for very practical suggestions. The big task is to learn how to be convincing—how to get action! Most of our readers or hearers will agree to all that we offer—but will they adopt the suggestions?

One effort to "get under the skin" of the indifferent is the Syracuse "No-Cold Club." The "membership application and pledge" reads:

> I want to be a Reg'lar Feller! Therefore, I solemnly promise to do my best to avoid colds, and will follow the By-Laws and rules of the No-Cold Club. I will also try to protect others from colds, and will tell others about the Club.

An illustrated 4-page folder gives the constitution and by-laws which bring out the anti-cold propaganda in unusual fashion. *It is not copyrighted.* Be sure to ask the Health Department or other health agency in Syracuse, N. Y., for a copy. The folder costs about $4.75 per 1,000 in 10,000 lots.

DATES AHEAD

Parents' Exposition, Grand Central Palace, New York, N. Y., February 23–March 2, 1929. Address: Parents' Exposition, 152 West 42d Street, New York, N. Y.

National Negro Health Week, March 31–April 7, 1929. Address: U. S. Public Health Service, Washington, D. C., or National Negro Health Week Committee, Tuskegee Institute, Ala. An opportunity for tuberculosis and other health agencies to serve as secretary or executive of state or local celebrations.

COÖPERATING GROUPS

Every community of any size contains numerous groups open to suggestions as to topics for papers, debates, discussions, reports and other forms of presentation. Boys' clubs, settlement clubs, school societies, debating clubs, men's Bible classes, church societies, and numerous others have programs of one type or another which should appeal to the ingenious health worker—not to offer speakers but to suggest ideas by which health material may be brought into their regular programs by their own members. College debating teams should not be out of our reach, and graduation essays are an easy possibility. Inter-settlement debates, speeches, etc., could be tried. *What have we done in any of these directions?* State and national health bodies might well tackle this job.

The revised Manual for Chapters (American Red Cross, Washington, D. C.) includes chapters on First Aid, Life Saving, Public Health Nursing, Home Hygiene and Care of the Sick, and Nutrition Service.

PUBLICITY DICTIONARY

Propaganda: "And publicity is propaganda, since it leads people who might be thinking of anything else in the world to concentrate on this one special thing for the moment."—Harrison Smith in "Do Book Reviews Sell Books?" *Atlantic Bookshelf,* May, 1928.

OFFICE

Ask *The Nation,* 20 Vesey St., New York, N. Y., for a copy of the green, hand-lettered renewal blank headed "Your subscription expires next month." Illustrates the distinctiveness of hand lettering—and colored paper—for small pieces of printed matter.

"Dictated but not read" still appears at the bottom of some letters. Such a letter says: "Here, old thing, is something I dashed off. It may not mean what it says, but it is up to you to decide what it does mean. It is not my responsibility." Why not return the letter with the endorsement "Received but not read"?

If you must write "Personal" or any other admonition to the one who opens mail it should be placed immediately above the address if you truly wish it to receive attention. My observation is that those who open mail do not look at the bottom of the envelope for special instructions.

But don't risk "Personal" unless it is personal. Writing on "Personal and Private" in *Printer's Ink* (Aug. 23,

1928), Amos Bradbury emphasizes "a growing practice among advertisers which is doing far more harm than good." The writer makes particular reference to the unfortunate use of "personal" on letters appealing for contributions.

The Milbank Memorial Fund, 29 Wall St., New York, N. Y., uses an effective printed address label for large envelopes and packages.

"The Vertifile" looks good for keeping cuts or plates from being scratched or lost. Harlo R. Grant and Co., 2322 West Madison St., Chicago, Ill.

To secure examples of how form letters, without individual addresses filled in, can be made effective in different sizes and shapes, ask for information and get on the mailing list by addressing Encyclopedia Britannica, 342 Madison Ave., New York, N. Y.

When you fail to get a reply to your letter asking for information or advice the simplest follow-up is a fresh copy of the original letter. This usually works, but sometimes a third or even a fourth copy needs to be sent when you are anxious for a reply. Letters do get lost in the mail—or in the office. And there may be good reasons for not getting off quickly a reply to your request. But to write and request a reply to your letter of a certain date may not help much. Suppose it was never received or has been mislaid!

CAMPAIGNS—SPECIAL DAYS

Early Diagnosis Campaign conducted by tuberculosis and other health agencies in March. Address any state tuberculosis association. The list of supplies, 23 items, includes folders, small pamphlets, 24-sheet billboard poster, smaller posters and cards, car cards, high school poster, gummed posterette, window display, lantern slides, strip film, motion pictures, electrotypes.

The Syracuse "No-Cold Club" is a feature of a campaign in which for newspaper publicity the Onondaga Health Association, Syracuse, N. Y., is enrolling the mayor, sorority girls, Rotarians, and other personalities, with quotations, interviews and radio talks.

A three-year campaign to secure "100 per cent sanitation" is under way in Virginia. Prizes are to be offered to the associations that secure the most improvements during the campaign. The slogan is "Virginia, the first state sanitated." A report of present conditions shows for each county the approximate number of homes, the percentage with proper sewage disposal, percentage with safe water supply and with adequate fly control. Rules of the contest and other helps are available through the State Department of Health.

NEWSPAPERS

"Of the news articles which yielded probably the largest number of clippings was one beginning 'A rheumatic twinge may not prophesy stormy weather,' declares Dr. Merrill M. Myers, president of the Iowa Heart Association, 'but . . .'"—*Annual Report of Iowa Tuberculosis Assn.*

That syndicates are selling 17 different daily or weekly health columns to the newspapers of the United States and Canada was revealed in Annual Directory of Features in *Editor and Publisher*, Times Bldg., New York, N. Y., Aug. 25. 90 cents. Eighty-three syndicates now offer nearly 2,000 different features to the newspapers, including 11 series of crossword puzzles!

The syndicated health columns are written by Dr. John Joseph Gaines, Dr. Logan Glendenning, Dr. Morris Fishbein, Dr. Herman N. Bundesen, Dr. Frank McCory, Dr. William Brady, Gorgas Memorial, Dr. Lulu Hunt Peters, Dinah Day, Jessie Knox, Dr. W. A. Evans, Dr. J. A. Jackson, Dr. J. W. Barton, and Paul J. Veatch.

BOOKS AND REPORTS

Public Health and Hygiene—*Edited by William Hallock Park, M.D. (2d ed. rev.) Philadelphia: Lea & Febiger,* 1928. 902 pp. Price, $9.00.

In the eight years which have elapsed since the publication of the first edition of this book, much has been added to our knowledge of public health, so that a second edition was most desirable. The present volume shows evidence of rewriting as well as careful revision.

Twenty-four authors have contributed to the present volume. The deaths of two of the original contributors, and the withdrawal of others, have made certain changes necessary. Additional chapters have been added on the control of cancer and the proper handling of patients suffering from contagious diseases, in order to prevent cross infections. Seven important subjects are treated by new writers.

There is little to criticise in the book. The individual chapters are complete in themselves and of high quality. The facts are not only correctly given, but the presentation is clear and understandable, an especially desirable feature, since the book is intended not for specialists in public health, but for physicians generally, and even students.

Because of advances which have been made during the past few years in our knowledge of foods, probably the most interesting chapters are those treating of this subject, and especially those on milk. In view of the increased use of dried milk, we wish that more than nine lines had been devoted to its consideration.

Some rearrangement is advisable, since septic sore throat, conjunctivitis, trachoma, tetanus, leprosy and mumps are included under infectious diseases of the respiratory tract. There may be some reason for placing leprosy and mumps in this category, as our knowledge concerning them is very incomplete, but certainly the others do not belong there.

The book is a distinct addition to one's library. The printing and make-up are exceptionally good.

M. P. RAVENEL

The Determination of Hydrogen Ions—*By W. Mansfield Clark, Ph.D. (3d ed.) Baltimore: Williams & Wilkins,* 1928. 717 pp. Price, $6.50.

The third edition of this work, which has become almost classic, especially in biological fields, is 50 per cent larger than the second edition and more than double the size of the first edition, though it has not become unwieldy. The increase in size is not due to haphazard additions. More than one part of the second edition has been critically curtailed in the revision, e.g. the bibliography has been cut from over 110 pages to about 80, covering the same range but with a more critical selection of titles.

A somewhat greater air of chemical sophistication appears in this edition due to the author's concept, in this revision, that it " is the function of this book to tell *about* a few of the more important matters in terms agreeing essentially with those which the reader will have to know in his study of the literature." Formal definitions of many such terms are made available in the appendix.

The author has succeeded, despite enough added material more than to justify the publishers' claims of " much new material and many new graphs," in keeping intact not only the general

structure of the book, with slight alterations in chapter order and numbering, but also the "more or less discoursive style," which has made each of the editions so readable.

The more obvious of the new material consists of: Chapter VII on The Application of Spectrophotometry, Colorimetry, etc.; Chapter XI on Changes of Free Energy; Chapter XVIII on Oxidation-reduction Potentials replacing the chapter on the Relation of the Hydrogen Electrode Potentials to Reduction Potentials; Chapters XIX and XX on a series of oxidation-reduction electrodes, the glass electrode, the oxygen electrode, etc.; Chapter XXII on Temperature Coefficients; Chapter XXV on The Theory of Debye and Hückel; Chapter XXVII on An Alternative Method of Formulating Acid-base Equilibria; and Chapters XXVIII and XXIX on Elementary Theory of Titration and Non-aqueous Solutions respectively.

These added chapters by no means exhaust the "new material." The older chapters have been very largely rewritten and much new matter incorporated, and the appendix, which has been greatly amplified, contains a fund of information.

The book can be recommended not only as a guide in matters of technic, but also as a store of subtle suggestion and an abundant source of information.

ALLEN E. STEARN

The Intelligent Woman's Guide to Socialism and Capitalism—*By Bernard Shaw. New York: Brentano's, 1928.* 495 pp. Price, $3.00.

The crafty pen of George Bernard Shaw will again give rise to dilatations upon the topics discussed, which, however, will soon lapse, because of the lack of adequate examples and statistics supporting most of his arguments concerning the seven proposed plans for the distribution of the country's income.

The book smacks a little of careful pigeonholing of past observations in order to revile effectively Capitalism as a background, in sharp contrast to Socialism painted in relief. It reminds one of the common fallacious belief that "If a small amount of medicine is good, an increased amount will be better." One misses the appreciation of the infinite varieties necessary not only for the "whole," but likewise the need of contrast for the individual. Consideration of the probable mode of transition from Capitalism to Socialism would add greatly to the value of the book. However, the author may claim that since the analysis has not been based on clean dissection, it should serve merely as provocative of thought, not decision. Too many statements take for granted the frequently absent capabilities and sense of proportion and values in individuals. The book is typically Shavian, stimulating to thinking and discussion.

M. P. RAVENEL

Physiology and Human Life—*By Robert A. Budington. Based on Advanced Physiology and Hygiene by Herbert A. Con and Robert A. Budington. New York: Silver, Burdett & Co., 1928.* 395 pp. (195 figs.) Price, $1.56.

This is a revision of an earlier widely used school text, bringing it up to date in the important fields of the endocrines, the rôle of the vitamins, and the effects of light upon tissues directly and upon metabolism. It also incorporates important advances in the knowledge and control of diseases made in recent years. The text has been entirely rewritten with emphasis upon the clearly established and well confirmed phases of these sciences. Each of the 22 chapters is supplemented by a list of readings in standard works and a list of questions designed to stimulate interest in the relations of the subject matter to the physiological facts of everyday life

and to disease in relation both to the individual and to public health. While the book is an admirable one with reference to its use in the discipline of education in scientific lines, it also has high value in inculcating in the reader an appreciation of the value of an intelligent and reasoned pursuit of good health. All public health workers will find in it a valuable work of reference for elementary use and an inspiring treatise in its point of view and purpose.

C. A. KOFOID

Social Work and the Training of Social Workers—*By Sydnor H. Walker. Chapel Hill, N. C.: University of North Carolina, 1928.* 238 pp. Price, $2.00.

The University of North Carolina Press has already issued a score of Social Studies ranging in price from $1.00 to $5.00, all of which should be in every social worker's library.

"No field of modern social concern," says the jacket of the present volume, "needs clear analysis or critical study more than social work. . . . Since Miss Walker is not a social worker and never has been one, her study happily lacks any semblance of special pleading and avoids narrowness—that occupational disease of the specialist."

If this were a column instead of a review, it might be amusing to consider whether the word "happily" should have been omitted in the quotation; and to discuss whether not being a social worker is really a guarantee against narrowness and the semblance of special pleading in a book which deals with social work and training for it.

However, this book is relatively free from such defects; and is the more readable because it seems to be written in the language of a student of education and economics with few of those special turns of thought and language which are so familiar in the conference papers, the periodicals and the textbooks of social work.

After preliminary chapters discussing the backgrounds, the characteristics and motives, and the objectives, of social work and the sources of its financial support, the author comes closer to her task in trying to discover what are really its characteristic activities and to interpret its claims. The eighth and ninth chapters set forth the educational needs of social workers, contrasting the prevalent apprenticeship with the specialized education now admitted to be essential, and then briefly but fairly describe the present professional schools and their courses. In the closing chapter Miss Walker discusses the very unsatisfactory existing relation between social work and the social sciences.

There are an extensive classified bibliography of over 30 pages and a directory of more than 50 periodicals in the field of social welfare and applied social science. EDWARD T. DEVINE

The Healers—*By B. Liber. New York: Rational Living, 1928.* 454 pp. Price, $3.00.

The healer who reads B. Liber's book will not find much comfort for his shortcomings whether he be regular or cultist. It might not do healers any harm to read the book; and health workers may well expect to profit by trying to understand the point of view of this biographical presentation of the trials and tribulations of an individual who, in attaining his medical degree, was not moulded into a standard product.

Paper, printing and literary style do not contribute to make the book easy or pleasant reading. Though it might be profitable reading for "healers," it is difficult to understand the place of such a book in general health literature.

ALEC N. THOMSON

Hunger Fighters—*By Paul de Kruif. New York: Harcourt, Brace, 1928.* 370 pp. Price, $3.00.

If the author of that interesting and successful book, *Microbe Hunters*, were contributing this review, he would probably say something like this: "The writer of that popular book, *Microbe Hunters*, has burst forth again to haul a bunch of bum scientists out of obscurity and tell the world their stuff in his customary and effusive style." And, despite a somewhat flatulent manner, he has told it, told it in 11 romantic short stories that hold the reader's interest from start to finish, even though there are times when the reader is forced to suspect that the romance runs away with the facts.

At the beginning of this engrossing volume the reader is given to understand that all of these heroes were completely forgotten until de Kruif honored them with his attention. This may be true of a few of his subjects, such as Carleton, the "wheat dreamer"; and it may be that the general public has never heard much about some of these workers, mostly governmental scientists; but certainly Mohler and Dorset, Babcock and Steenbock, Francis and Goldberger are well and favorably known in agricultural, public health, and general scientific circles. As a result of this book they will receive due recognition of their achievements.

Public health is indeed well represented in this group of stories about men who have contributed to human welfare, particularly in matters allied to food production. There are tales of the remarkable work on tularemia by Francis, the conquest of pellagra by Goldberger, the discovery of the principle of irradiation of foods by Steenbock, the development of genetic facts by Shull, the onslaught on hog cholera by Dorset, and the control of foot and mouth disease by Mohler. He has written a captivating book of narratives, as well worth perusal as those in *Microbe Hunters*.

The book is exceptionally well printed, with type that ought to delight the National Society for the Prevention of Blindness. It is competently illustrated by "Zadig." Read it by all means, for it is a fascinating volume.

JAMES A. TOBEY

Goiter Prevention and Thyroid Protection—*By Israel Bram, M.D. Philadelphia: F. A. Davis,* 1928. 327 pp. Price, $3.50.

The author discusses a subject of growing importance. The book has been written chiefly for the layman, though it is expected to be useful for the medical man as well. It is probable that more than 7 million people suffer from goiter in this country, in addition to which, Graves' disease, which the author considers a constitutional condition, influenced by the prevalent unrest and excitement of the general mode of living in this country, is taking an increasing toll of victims. Altogether, he considers that the thyroid gland is "more sinned against than sinning."

There is a good description of the thyroid, its functions in health, and the results of disturbed function. The chapter on endemic goiter is contributed by Dr. Olesen of the U. S. Public Health Service, and discusses its prevention by the use of iodine. The views of Dr. McCarrison on the relationship of iodine to goiter are also given, and we are warned against the promiscuous use of iodine and obesity cures, most of which contain thyroid extract. Especially dangerous is the taking of iodine in the exophthalmic form of the disease. There is a chapter on diet, which the author believes has a strong bearing on the structure and function of the thyroid gland.

While the book considers treatment, the author states that this is the busi-

ness of the physician, and those who feel that they are overweight should consult a physician before undertaking measures for reduction. Great stress is laid on relaxing and recreating forces, the chief of which he considers ". . . a healthy religion, sleep, music and laughter."

An appendix gives a brief description of the various ductless glands of the body and some history of our knowledge of endocrinology.

The material given is mostly sound, and there is much useful advice, though we believe that the endeavor to make a book for both the physician and the patient is a mistake.

The book is well printed and illustrated. M. P. RAVENEL

Physiology and Biochemistry of Bacteria. Vol. I—*By R. E. Buchanan and Ellis I. Fulmer. Baltimore: Williams & Wilkins, 1928.* 516 pp. Price, $7.50.

Progress in a science can often be best served by pausing to evaluate the disclosures of the past. Not only can the advances in the understanding of a specific subject be revealed by such a procedure, but a mere recounting of past discoveries serves to point the way to further advances and guards against following more or less seductive courses of action founded upon false premises. For a science presenting the phenomenal development of bacteriology such a pause for consideration of the validity of fundamental concepts is imperative, for, unless the facts keep within measurable distance of theory, the errors of the past become cumulative and fallacy will but lead to greater fallacy. It is gradually becoming evident that bacterial activity is not a thing wholly different and apart from other biological activities; that it is directed by and can only be explained by those laws recognized by the chemist and the physicist as governing biological phenomena in general.

Recognizing these things the authors of *Physiology and Biochemistry of Bacteria* have attempted to collect and evaluate the available information concerning the more fundamental properties of bacteria and the principles governing bacterial action. This they have done in admirable fashion, presenting a text that is worthy of the attention of all who are concerned with a study of any phase of bacteriology.

To record the sub-title of the book—Growth Phases, Composition and Biophysical Chemistry of Bacteria and their Environment, Energetics—states in the briefest possible way the content, but does not adequately express the diversity of the information presented. The enormous amount of work which has been done upon these basic subjects is impressive, and here, for the first time, may be found collected and interpreted those facts which future work in bacteriology must recognize. The recurring statement that more work should be done cannot fail to furnish the incentive for study in many directions, and serves to point out how incomplete our knowledge of many important phases of bacteriology is at present. Aside from its interest as an effort to deal with the more intimate phases of bacterial activity the text is readable and has great value as a reference book. The sub-title designates the book as Volume I. For the sake of bacteriology and bacteriologists it is to be hoped that other volumes will be forthcoming. GEORGE H. SMITH

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

Tuberculosis Susceptibility and Humidity—High temperature and humidity did not alter the susceptibility and resistance of guinea pigs to tuberculosis.

BAETJER, A. M., and LANGE, L. B. The Effect of High Humidity and Moderately High Temperature on the Susceptibility and Resistance to Tuberculosis in Guinea Pigs. Am. J. Hyg. 8, 6: 935 (Nov.), 1928.

Venereal Disease Control—A general review of venereal disease control practice summarizing the work of one Canadian clinic.

BATES, G. The Venereal Disease Clinic. Pub. Health J. (Canada) 19, 10: 466 (Oct.), 1928.

Recognition of Juvenile Tuberculosis—A review of 300 preventorium cases which emphasizes the indefiniteness of physical signs and the importance of history. The need for preventoria for the observation of children is stressed.

BRONFIN, I. D. The Preventorium Child. Am. J. Dis. Child. 36, 5: 931 (Nov.), 1928.

More about Rheumatism—A symposium on rheumatism by foreign authors. The British medical press has been full of similar articles. The present series has the virtue of bringing the same material within easy reach of American readers.

CLARKE, J. T., et al. Symposium on Rheumatism. M. J. & Record 128, 9: 457 (Nov. 7), 1928.

Diphtheria Control—The difficulties of eradicating diphtheria in institutions by means of carrier finding procedures are stressed. Immunization with toxoid was found most effective in the naval school reported upon.

DUDLEY, S. F. The Control of Diphtheria in Crowded Institutions. Pub. Health (London) 42, 2: 1927 (Nov.), 1928.

Health Examinations and Cancer—The value of the periodic health audit is discussed and its particular importance in the detection of cancer is stressed.

FAUGHT, F. A. Health Examinations as a Means of Diagnosis in Cancer Control. M. J. & Record 128, 10: 515 (Nov. 21), 1928.

Skyshine and Rickets—White rats on a vitamin D deficient diet exposed to a north light behind Vitaglass had normal calcification of the bones whereas those behind ordinary glass developed marked rickets. Evidently skyshine provides ample antirachitic factor and direct sunlight an excess.

FLEMING, W. D. The Antirachitic Efficiency of Skyshine in Washington, D. C. Mil. Surgeon 63, 5: 658 (Nov.), 1928.

Child Care by Physicians—A summary of the points in child nurture with which the practicing physician should be familiar in order to guide the mother adequately. An excellent presentation.

GOLDBLOOM, A. The Rôle of the Physician in the Rearing of Children. New York State J. Med. 28, 21: 1274 (Nov. 1), 1928.

Phenol Soaps—Experiments are reported showing inhibitory action of soaps on phenol, indicating the uselessness of the latter in the production of germicidal soaps.

HAMPIL, B. The Effect of Pure Soaps on the Bactericidal Properties of Phenolic Germicides. J. Bact. 16, 5: 287 (Nov.), 1928.

Post-Sanatorium Care—How tuberculosis convalescents are brought back to productive life in a special work shop

is the story of this successful pioneering enterprise.

HOCHHAUSER, E. The Story of the Altro Work Shops. New England J. Med. 199, 19: 915 (Nov. 8), 1928.

Prenatal Hoarding of Antirachitic Vitamin—To test the validity of the assumption that the antirachitic factor is stored in the liver before birth, the potency of the factor in livers of premature and full-term infants was determined. No difference was found, which indicates that the predisposition of premature infants to the disease does not depend upon prenatal hoarding.

HESS, A. F., and WEINSTOCK, M. An Investigation of the Prenatal Factor in the Susceptibility of Infants to Rickets. Am. J. Dis. Child. 36, 5: 966 (Nov.), 1928.

Rickets Preventives—Cod liver oil in 5 mg. doses gives better protection to white rats against rickets than ultraviolet irradiation. Larger amounts of oil afforded no greater protection.

HOLMES, A. D., *et al.* A Comparison of Cod Liver Oil and Ultraviolet Light for Use in the Prevention of Rickets. Am. J. Dis. Child. 36, 5: 952 (Nov.), 1928.

Employment of the Tuberculous—A report on a successful experiment in medically supervised employment for 676 patients recovering from tuberculosis.

KLEIN, A. C., and THORBURN, G. Employment of the Tuberculous. N. Y. Tuberc. & Health Assn. Publication (Nov.), 1928.

Prevention of Human Rabies—Two deaths from rabies are reported in which the patients were bitten on the lip by known rabid dogs. Local treatment and Pasteur treatment (begun 3 and 4 days later) failed to prevent the disease. Immediate Pasteur treatment and cauterization with fuming nitric acid is urged.

RICE, T. B. Two Human Cases of Rabies. J. A. M. A. 91, 21: 1631 (Nov. 24), 1928.

Tuberculosis and Public Health—This Herman M. Biggs Memorial Lecture is a masterful and detailed presentation of the whole subject of health promotion and disease prevention. Too inclusive for summarization here.

KRAUSE, A. K. Tuberculosis and Public Health. Am. Rev. Tuberc., 18, 8: 271 (Sept.), 1928.

Health Work in Flood Area—Federal, State and non-official health agencies united to create in the Mississippi flood area 86 full-time county health units. A lasting blessing growing out of a great disaster.

LEACH, C. N. Progress of Health Work in the Mississippi Flood Area. J. A. M. A. 91, 21: 1595 (Nov. 24), 1928.

Per Capita Milk Consumption—A thorough house-to-house canvass of 18 southern communities revealed a higher per capita milk consumption among the whites than in the larger cities in the country. In these communities the daily consumption was 1.23 pints per capita.

LEACH, C. N., and FRANK, L. C. Milk Consumption in Eighteen Small Alabama Communities. Pub. Health Rep. 43, 45: 2955 (Nov. 18), 1928.

Maternal Mortality—A plea for better obstetrical practice by the family physician who makes 80 per cent of all deliveries. If lower maternal death rates are not secured in this way, State intervention threatens.

LITZENBERG, J. C. Obstetrics and Gynecology in Public Health Program. J. A. M. A. 91, 21: 1587 (Nov. 24), 1928

Prevalence of Venereal Diseases—A state-wide survey of cases of venereal disease under medical supervision made by the New York State Department of Health showed a prevalence rate of 4.57 per thousand. Many other interesting facts were revealed by the study.

PFEIFFER, A., and CUMMINGS, H. W. The Prevalence of Syphilis and Gonorrhea. New York State J. Med. 28, 19: 1147 (Oct. 1), 1928.

Etiology of Poliomyelitis—Streptococci recovered from the spinal fluid of fatal cases of poliomyelitis and experimentally inoculated monkeys were agglutinated specifically with hyperimmune poliomyelitis antistreptococcus serum.

ROSENAU, E. C. Streptococci in the Spinal Fluid in Acute Epidemic Poliomyelitis. J. A. M. A. 91, 21: 1595 (Nov. 24), 1928.

Carrier Infected Food—This is a report of an epidemiologic study of a typhoid fever outbreak found to be due to the consumption of corned beef infected by a carrier who prepared the meat for a church supper.

SCAMMAN, C. L., and FORSBECK, F. C. An Outbreak of Typhoid Fever Traced to Corned Beef Infected by a Carrier. New England J. Med. 199, 14: 664 (Oct. 4), 1928.

Scarlet Fever Prevention—The therapeutic and prophylactic use of anti-scarlet fever serum is questioned, but the use of toxin for immunization was successful in this author's experience.

TOOMEY, J. A. Treatment and Prevention of Scarlet Fever by Specific Antitoxins. J. A. M. A. 91, 21: 1599 (Nov. 24), 1928.

Biology of Senescence—The evolution and involution of human life is discussed in detail at the opening of Graduate Fortnight of the New York Academy of Medicine. A well drawn picture of the biology of life.

WARTHIN, A. S. The Pathology of the Aging Process. New York State J. Med. 28, 22: 1349 (Nov. 15), 1928.

Posters for Diabetics—Not only what to eat, but how to live, are the questions answered by this series of posters used to instruct diabetic patients.

WILLIAMS, J. R., and VYE, M. The Use of Posters as a Means of Instruction in a Diabetic Clinic. J. Lab. & Clin. Med., 14, 1: 57 (Oct.), 1928.

The National Tuberculosis Program—The program of the tuberculosis associations is on a sound basis and is one of the potent factors in the fall of the tuberculosis death rate. The individual objectives are discussed in convincing detail.

WILLIAMS, L. R. The Scientific Basis of the Program and the Accomplishments of the National Tuberculosis Program. Am. Rev. Tuberc., 18, 8: 249 (Sept.), 1928.

Cost of Nursing Service—A simple method of computing the cost of public health nursing visits is discussed. Although administrative costs are not allocated, the method is recommended because of its simplicity and value in determining costs of specific services and relative amounts budgeted for each.

WINSLOW, EMMA A. Service Costs and Program Planning. Pub. Health Nurse 20, 11: 569 (Nov.), 1928.

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

Dental Clinic Services, New York, N. Y.—The dental clinic facilities now serving men, women and children of Greater New York who require free dental care or dental service at moderate costs are not adequate for the needs of this portion of the city's 6,000,000 population, according to a study just published in booklet form by the New York Tuberculosis and Health Association. In one district alone 20,000 school children whose teeth have been examined are waiting to have the necessary dental care done.

These and other significant facts are revealed in the report of a survey made by the association's Committee on Community Dental Service to bring to date a similar study made in 1923 and to review the dental clinic facilities of the city in terms of the community's needs. All the dental clinics in Greater New York, a total of 152, excluding those maintained and operated by specific industries for their employes only, were visited by a trained worker and the facilities and services were studied.

The study also discloses a tendency for dental clinic services to concentrate in Manhattan in spite of the trend of the population to other boroughs.

Since 1923, when the first survey was made, the clinics have increased from 104 to 152. Of the 56 new clinics established during the last 5 years, 35 clinics, or 65 per cent of the total, are in Manhattan. Twelve new clinics, or 21 per cent, are in Brooklyn; 5 clinics, or 9 per cent, in the Bronx; 3 clinics, or 5 per cent, in Richmond.

The study shows that most of the clinics serve only persons living in a specified area, members of a definite group of people such as club members in a settlement house, or patients within certain hospitals. Only one-fourth of the clinics serve the general patient.

Few of the clinics approach self-support, the survey reveals, but, in most cases, the fees charged enable them to be partially self-supporting. The fees vary from no charge in the case of 23 clinics to a fee of $1.50 for one clinic. The common admission fee, however, is $.25. Exclusive of all plant costs which include heat, light, rent and original equipment, the cost of dental care in clinics is estimated at between $3.00 and $3.50 an hour.

The Committee on Community Dental Service of the New York Tuberculosis and Health Association is planning this winter's program in view of the recommendations suggested by this survey. It is making a study of the population centers most in need of dental clinic facilities. It is attempting to interest the individuals and organizations of these districts in providing means to supply services where the need is greatest.

Los Angeles School District—School health officials will find interesting the 1926–27 report of the Department of Health and Corrective Physical Education of the Los Angeles City Schools. The department is divided into 30 sections and has a personnel of 315, including a medical director, 5 assistant directors, 30 physician inspectors, 29 physician consultants, 12 dentists, 62 nurse inspectors, 10 nurse teachers in high schools and 70 physical education teachers, among others. During the year 165,321 children were given physical examinations. According to the report children are examined upon entrance and at least every third year unless special defects require more constant supervision.

Every applicant seeking appointment

on the teaching staff of the city schools has had a careful examination as to physical fitness. A total of 2,550 teachers were examined during the year.

The corrective physical education section after 8 years of growth is able to reach approximately 50,000 children yearly with special care. All the senior and junior high schools have corrective rooms with teachers in charge. Since January, 1926, there have been 13 corrective physical education centers in operation to care for elementary children. From various schools children are sent with bad posture, flat feet, heart affections, nutrition disturbances and paralyses. Once a month an orthopedic specialist examines the most extreme cases of indigent paralytic children. The medical supervision of the examination is cared for by a special physician. It is also stated that 9,000 children with heart defects have been aided by this department.

"The value of nutrition classes is being realized as time advances and the work has had an opportunity to prove itself. Reports on improvement in school work, physical appearance, concentration, coöperation, disposition and general health have been received from the principals in schools where classes were conducted."

Open air sun rooms have been conducted in 10 schools. Eight health centers are utilized in addition to a Traveling Health Unit. The Parent-Teacher Associations coöperate fully in the school health program. The report concludes with a detailed statistical summary of defects found and corrected during the year.

BOOKS RECEIVED

WHITHER MANKIND. A PANORAMA OF MODERN CIVILIZATION. Edited by Charles A. Beard. New York: Longmans, Green, 1928. 408 pp. Price, $3.00.

WHEAT FLOUR AND DIET. By G. O. Swanson. New York: Macmillan, 1928. 203 pp. Price, $2.50.

PARENTS AND CHILDREN. By Ernest R. Groves and Gladys Hoagland Groves. Philadelphia: Lippincott, 1928. 196 pp. Price, $2.00.

BACTERIOLOGY. A TEXT-BOOK OF MICRO-ORGANISMS. By Fred Wilbut Tanner. New York: Wiley, 1928. 548 pp. Price, $4.50.

CONFERENCE OF SOCIAL WORK, MEMPHIS, TENN., MAY 2–9, 1928. Chicago: University of Chicago, 1928. 670 pp.

AN INTRODUCTION TO PRACTICAL BACTERIOLOGY. (2d ed.) By T. J. Mackie and J. E. McCartney. New York: Wood, 1928. 390 pp. Price, $3.50.

THE DOCTOR LOOKS AT MARRIAGE AND MEDICINE. By Joseph Collins. New York: Doubleday, Doran, 1928. 313 pp. Price, $3.00.

HANDBOOK ON VENEREAL DISEASES. By W. Turner Warwick. London: Faber & Gwyer, 1928. 221 pp. Price, $2.00.

THE PRINCIPLES AND PRACTICE OF THE DILUTION METHOD OF SEWAGE DISPOSAL. By W. E. Adeney. New York: Macmillan, 1928. 161 pp. Price, $5.00.

THE HOME DIETITIAN. (3d ed.) Compiled by Ella Mae Ives. Philadelphia: David McKay Co., 1928. 750 pp. Price, $2.50.

WHY NOT GROW YOUNG? OR, LIVING FOR LONGEVITY. By Robert W. Service. Newark: Barse, 1928. 266 pp. Price, $1.50.

PARTNERSHIPS, COMBINATIONS AND ANTAGONISMS IN DISEASE. By Edward C. B. Ibotson. Philadelphia: Davis, 1928. 348 pp. Price, $3.50.

THE KAHN TEST. A Practical Guide. By R. L. Kahn. Baltimore: Williams & Wilkins, 1928. 201 pp. Price, $4.00.

LEAGUE OF NATIONS NEWS

C.-E. A. WINSLOW, DR. P. H.

Technical Conference on BCG—October 15–18, there was held in Paris a meeting of experts to draw up a program of international studies on the Calmette vaccine for tuberculosis. The conference included three special commissions, one of bacteriologists, one of clinicians, and one of veterinarians. The first of these commissions under the chairmanship of Professor Bordet of Brussels concluded that BCG* is a harmless vaccine which does not give rise to progressive tuberculosis, although Professor Nobel of Vienna maintained that in exceptional conditions BCG was capable of producing fatal tuberculosis in laboratory animals. The clinical conference concluded:

1. That BCG administered by mouth to infants within the first 10 days of life and by subcutaneous inoculation in other children and in adults is incapable of producing virulent tuberculosis lesions.

2. That vaccination by BCG produces a certain degree of immunity against tuberculosis.

The veterinary commission concluded that:

1. The experimental facts published and the unanimous opinion of practitioners who have used BCG in cattle justify the conclusions that vaccination carried out according to the technic of Calmette and Guérin, among bovines, is a perfectly harmless procedure.

2. Similar experimental data and published observations with regard to the use of BCG among bovines demonstrate that this strain of bacteria confers definite immunity against both experimental and natural tuberculosis infection. These recognized "pre-immunising" (prémunisantes) qualities justify and encourage the extension of the experimental use of BCG in the prevention of bovine tuberculosis.

An extensive program of further study was recommended and this program has been approved by the Health Committee of the League. The Health Committee expressed no opinion in regard to the conference conclusions cited above.

Fall Meeting of the Health Committee—The Health Committee of the League of Nations held its fall meeting October 25–31, the United States being represented by Professor Alice Hamilton. The committee considered a request from the Council of the League that the health organization should "collect full statistical information regarding alcoholism considered as a consequence of the abuse of alcohol, giving prominence, *inter alia*, according to the data available, to the deleterious effects of the bad quality of the alcohols consumed." The Health Committee finally decided to ask the health administrations, at whose instance the Council's resolution was introduced, those of Finland, Poland, and Sweden, for more precise suggestions as to special lines of inquiry desired.

The Health Committee considered the reports of its malaria commission,* its permanent standards commission† and its special commissions dealing with infant mortality, cancer, and smallpox and vaccination. The infant mortality study is proceeding in a most encouraging manner with detailed inquiries cov-

* See p. 82 this issue, Editorial "The Calmette-Guérin Vaccine."

* See p. 24 this issue, Editorial "A Report with Real Meat." *Pub. Health Rep.*, Nov. 9, 1928, p. 2957.

† *Pub. Health Rep.*, Nov. 9, 1928, p. 2957.

ering periods of 12 months in selected areas in 7 European countries. The cancer commission is at work on a comparison of the results of radiotherapy in cancer treatment, particularly in Munich, Paris and Stockholm. The smallpox and vaccination commission reviewed the evidence as to post-vaccinal encephalitis in England and the Netherlands, concluded that post-vaccinal encephalitis is a definite entity due to an independent virus which becomes active in persons vaccinated against smallpox, and pointed out that accidents of this kind do not occur in young children, emphasizing the importance of early primary vaccination.

The Health Committee has been invited to undertake a special study of dengue fever in southern Europe and to collaborate in a reorganization of the public health service of Greece, both of which enterprises will be undertaken in the near future.

NEWS FROM THE FIELD

CINCINNATI LAUNCHES A CAMPAIGN AGAINST DIPHTHERIA

THE Cincinnati Health Department under auspices of the Cincinnati Academy of Medicine has launched a campaign for the immunization of all preschool children against diphtheria. It is in this age group that 90 per cent of the diphtheria cases and 60 per cent of the diphtheria deaths occur. Parents are urged to take their children to the family physicians for toxin-antitoxin treatment. Free clinics have been established to provide treatment for those children whose parents are unable to pay for medical service.

OAKLAND IMMUNIZES ITS CHILDREN

THE City Health Department of Oakland, Calif., under direction of Dr. C. R. Fancher, City Health Officer, has begun a campaign for the immunization of all Oakland children against diphtheria and scarlet fever. No fee is charged for the treatment and there has been a most satisfactory response of children to be immunized.

CANADIAN HOSPITAL LIBRARIES CONDUCTED BY COLLEGE WOMEN

IN two hospitals of Montreal and Quebec, Can., libraries are managed and to a large extent financed by a committee of alumnae of McGill University, Montreal. This library program is the outgrowth of the libraries organized in 1917 for the military hospitals. The library in the military hospital at Ste. Anne de Bellevue has 5,236 volumes, and although this is a hospital caring mostly for mental cases the circulation last year was 6,615 books. The Royal Victoria Hospital for civilians contains 3,219 books and the circulation in 1928 was 23,114, an average of 74 books a day.

SCHICK AND DICK TEST OBLIGATORY AMONG MEXICAN SCHOOL CHILDREN

IN the government schools of Mexico the Schick test for diphtheria and the Dick test for scarlet fever are compulsory for all pupils coming within certain age limits and the tests and treatment administered upon recommendation are given by public health and school physicians.

GIFT OF $100,000 FOR CANCER TREATMENT

A GIFT of $100,000 was recently given to the Graduate School of Medicine, University of Pennsylvania, for the purchase of a gram of radium and other accessories for the treatment of cancer. The gift is from Louis J.

Kolb, of Germantown, Pa., a graduate of the University of Pennsylvania, class of 1887. The radium will cost about $72,000 and the balance of the gift will be used for cancer research. The fund will be known as the Louis J. Kolb Foundation for Treatment of Cancer. Dr. George E. Pfahler, professor of radiology and a former president of the American Roentgen Ray Society, will be in charge.

The university has also received a gift of $45,000 for cancer research from Irene duPont.

CHILD LABOR DAY

CHILD Labor Day will be observed January 26, 27 and 28 and the National Child Labor Committee under whose auspices this week has been inaugurated is asking the coöperation of schools, clubs, churches, private and public agencies to bring before the people of the country the problems of child labor so that public opinion eventually will be aroused to the complete abolition of child labor and universal legislation will be effected ruling against it.

OFFICERS OF MISSOURI CONFERENCE ON WATER PURIFICATION

AT the Fourth Annual Missouri Conference on Water Purification held at Hannibal, Mo., November 17, the following officers were elected: *Chairman*—C. E. Heflin, Water Commissioner, Cameron, Mo.; *Vice-Chairman*—S. J. Duncan, Superintendent Water Works, Moberly, Mo.; *Secretary-Treasurer*—H. D. Peters, Assistant Engineer, State Board of Health of Missouri; *Executive Committee*—W. V. Wier, Assistant Manager, St. Louis County Water Company, University City, Mo.; E. E. Wolfe, City Chemist, Hannibal, Mo.; W. P. Britain, Superintendent Water Works, West Plains, Mo.; J. N. Wells, Superintendent, Joplin Water Works Co., Joplin, Mo.

Among the several changes made in the constitution of the Conference was the change of the name to Missouri Water and Sewerage Conference in order to indicate the present scope of interest including municipal sewerage as well as water systems. Effort will be made for affiliation with the Conference of Sewage Works Associations. There was an attendance of 75 members.

DR. WILLIAMS RESIGNS AS NEW MEXICO COUNTY HEALTH OFFICER

DR. D. B. Williams, chief, Division of County Health Work, New Mexico State Bureau of Health, resigned January 1 after 6 years of service. The resignation of Dr. Williams was made necessary because of lack of funds to continue his salary and to meet the necessary traveling expenses. During his 6 years of service half of the expenses of this service was met by a grant from the Rockefeller Foundation, but the grant ceased January 1 and local funds were not available to carry on this county health program.

RASKOB MEMORIAL FOUNDATION TO AID NEEDY CHILDREN

THE Bill Raskob Foundation, incorporated with $1,000,000, has been established for the relief and assistance of needy children. The Foundation was established by John J. Raskob, chairman of the Democratic National Committee, in memory of his son, William Frederick Raskob, 2d, who was killed last fall in an automobile accident. Headquarters of the Foundation will be in Wilmington, Del.

DIRECTORY OF CITY HEALTH OFFICERS

A DIRECTORY for 1928 of health officers of cities of 10,000 or more population in the United States has been published in Volume 43, Number 46 of *Public Health Reports*, published by the U. S. Public Health Service, U. S.

Treasury Department. This has been published especially for the benefit of health officers and others interested or engaged in public health work. The data included in the directory have been furnished by the health officers of the cities. A directory of city health officers has been published by the U. S. Public Health Service each year since 1916.

HIGH RATE OF DEATHS FROM AUTOMOBILE ACCIDENTS

ACCORDING to an announcement made by the U. S. Department of Commerce, in the registration area of continental United States there were 21,160 accidental deaths in 1927 due to automobiles and other motor vehicles, excluding motorcycles, and the death rate from this cause was 19.5 per 1,000 population against 17.9 in 1926, 17 in 1925, 15.7 in 1924 and 14.9 in 1923.

The deaths assigned to automobile accidents do not include those due to collisions of automobiles with street cars and with railroad trains. In 1927 there were 476 deaths due to collisions of automobiles with street cars and 1,676 due to collisions with railroad trains.

REGISTRATION WORK IN NEW MEXICO AIDED BY ROCKEFELLER FOUNDATION

THE State Bureau of Public Health, New Mexico, has received an allotment of $200 a month for additional help on its birth and death registration program. The other agencies aiding New Mexico in its effort to get into the U. S. Registration Area are U. S. Bureau of the Census, U. S. Children's Bureau, and the American Public Health Association.

$204,400,000 GIVEN FOR HEALTH IN 1927

HEALTH activities received $204,400,000 from philanthropic donations during 1927. This sum was parceled out in the following sums: hospitals, $163,500,000; dispensaries, $9,600,000; public health nursing, $11,800,000; medical research, $13,000,000; health education, $6,500,000.

Education received $187,200,000; organized charitable relief in the United States, $256,700,000; play and recreation, $19,300,000; fine arts, $25,700,000; miscellaneous reform organizations, $13,000,000; religious purposes, $1,079,900,000; foreign relief including Armenia and the Near East, Austria, Poland, Germany, the Baltic States, Russia, Italy, the Balkans, China and Ireland, $214,500,000.

RACINE CHECKS UP HARD OF HEARING

IN Racine, Wis., recently the Board of Education requested the Board of Health to examine 40 children suspected of having difficulty with their hearing. The basis taken was 30 per cent disability. Examination showed that 13 of these pupils were over 30 per cent deaf in both ears; another 13 in one ear; 9 had loss of hearing in one or both ears of less than 30 per cent, and 5 had no actual loss of hearing, although some of them showed evidences of ear disease which if not checked might cause some degree of deafness.

Deafness was traced to diseased tonsils, enlarged adenoids; deafness following scarlet fever, measles, mastoid infections and influenza. Two children had badly constructed noses, and one suffered a running ear following an injury from a stone.

BIRTH REGISTRATION IN SANTA FE COUNTY, N. M.

SANTA Fe County, N. M., has been practically perfect in every check made on its birth and death registration. H. P. Mera, M.D., County Health Officer, attributes this to the close follow-up work and personal interest of his subregistrars. This explanation is made in the *Bulletin* of the New Mexico State Bureau of Public Health.

SIXTH SANITARIANS' SHORT SCHOOL OF TEXAS

AT the Sixth Sanitarians' Short School of Texas held early in November in San Antonio, 190 sanitarians were present. It was voted to hold the 1929 meeting in the lower Rio Grande Valley at Edinburg, Tex.

The following officers were elected: *President*—Dr. J. R. Mahone, whole-time county health officer, Edinburg; *First vice-president*—H. L. Darby, U. S. Department of Agriculture, Fort Worth; *Second vice-president*—Jack Wyatt, city chemist and director of sanitation, Amarillo; *Third vice-president*—Miss Delight Stone, supervising city health nurse, San Antonio; *Fourth vice-president*—Edgar Whedbee, assistant water supply engineer, Dallas; *Secretary-treasurer*—E. G. Eggert, sanitary engineer, State Department of Health, Austin.

WARNING AGAINST FRAUDULENT RAT EXTERMINATORS

EXPERT rat exterminators began a campaign among health officials and manufacturers during the summer in South Carolina, getting endorsement of the health officers, and money in advance of service in several instances from the manufacturers, but they failed to carry out their work against the rodents. This information comes to the *American Journal of Public Health and the Nation's Health* from Irving S. Barksdale, M.D., Commissioner of Health, Greenville, S. C.

The trio consisted of H. C. Noonan, T. H. Cooper and C. F. Hinman. The last named, however, did not appear in Greenville at any time. According to Dr. Barksdale the first two named came to Greenville with many references as to their ability and perseverance as rat exterminators. For two or three weeks after their arrival they apparently made an endeavor to render some service, but spent most of their time obtaining contracts and securing advance payments payable to the City Rat Campaign. This "City Rat Campaign" was unknown to Dr. Barksdale and unauthorized by him.

The exterminators baited several places, using, as some purchasers of the service estimate, about one dollar's worth of rat poison, and then disappeared very suddenly. Apparently they canvassed many cities of that southern area, obtaining contracts.

In making an exposé of the trio Dr. Barksdale has written to the Editor of the *American Journal of Public Health and the Nation's Health:* "I think you would render other health officials a great service if you would warn them against these self-styled expert rat exterminators. Their motives and methods seem very fraudulent."

DR. FRANCIS CONTRACTS MALTA FEVER

WHILE experimenting in his laboratory on the disease, Dr. Edward Francis, noted scientist of the U. S. Public Health Service and an authority on tularemia, contracted Malta fever recently. It is believed by laboratory associates that he acquired this cattle disease from cultures on which he had been working. Dr. Francis discovered that Malta fever is transmitted through milk of infected animals to human beings.

CALIFORNIA NURSES' HEADQUARTERS MOVE TO SACRAMENTO

THE Bureau of Registration of Nurses of the California State Department of Public Health, which has been located in the State Building, San Francisco, Calif., for several years, has moved to 405 Capitol Office Building, Sacramento.

All communications to this bureau should be addressed to P.O. Box 1159, Sacramento, Calif. The removal of the nurses' bureau to Sacramento is part of the reorganization of the state departments.

TRUCAS, N. M., TO CHECK SPREAD OF TYPHOID

UPON report that 7 cases of typhoid fever had developed at Trucas, N. M., J. I. Dunham, County Health Officer, immediately announced that the entire school population and at least 100 adults would be given typhoid vaccine injections, which means the inoculation of about 250 persons.

TEXAS WATER WORKS SCHOOL

THE Eleventh Texas Water Works School will be held January 14–25, 1929, at Bryan Agricultural and Mechanical College.

The school will be divided into several sections, including an elementary course in water works and sewage plant operation and sanitation.

DR. RECTOR GOES TO CHICAGO MEDICAL SOCIETY

FRANK L. Rector, M.D., Fellow A. P. H. A., formerly editor of *The Nation's Health*, and a member of the Chicago Medical Society, has been engaged as executive secretary of the Chicago Medical Society. Dr. Rector has just completed a report of a survey of health and hospital work in state and federal prisons.

PERSONALS

EMILY B. HEARD, R.N., has been appointed by the New Mexico State Bureau of Health as a field nurse under the Sheppard-Towner program for improving birth and death registration in the state. Her first assignment will be Otero County, N. M. Miss Heard has been engaged in public health nursing in Tennessee and Virginia.

DR. THURSTON W. LARAWAY is the new Health Officer of Elk River, Ida.

DR. C. M. BURCHFIEL has been appointed County Health Officer of Santa Clara County, Calif., by the board of supervisors to succeed the late Dr. William Simpson.

DR. H. B. EHLE, Health Officer of Lassen County, Calif., died in San Jose in October.

MRS. BEULAH M. KEITH has been appointed City Health Officer of Beaumont, Riverside County, Calif., to succeed Miss Beaunes Anderson.

DR. A. M. BURT, Health Officer of Ballston Lake, N. Y., died October 27.

CONFERENCES

January 16–18, American Society of Civil Engineers, New York, N. Y.

January 18–19, American Social Hygiene Association, New York, N. Y.

January 21, National Child Welfare Association, New York, N. Y.

January 22–23, Southwestern Tuberculosis Association, Ft. Worth, Tex.

January 28–31, American Society of Heating and Ventilating Engineers, Chicago, Ill.

January 29, Conference on Mental Hygiene in Public Health and Social Work, Boston, Mass.

February 23–March 2, Parents' Exposition, New York, N. Y.

February 24–28, National Education Association, Cleveland, O.

FOREIGN

April 3–6, Permanent International Committee on Occupational Diseases, Lyons, France.

July 17–August 13, Third Vienna Summer School, University of Vienna, Austria.

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